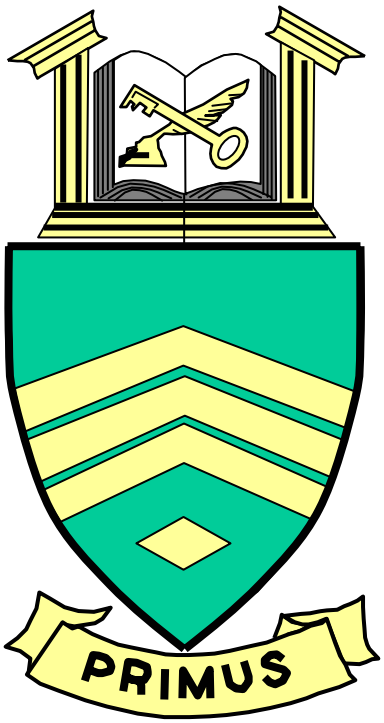
U.S. ARMY SERGEANTS MAJOR ACADEMY (FSC-TATS)

P661 (052002) JUN 01

MONITOR UNIT AND INDIVIDUAL FITNESS TRAINING PROGRAMS

# PRERESIDENT TRAINING SUPPORT PACKAGE



## Overview

The preservation of America's freedom is dependent on a strong defense. Our armed forces must be mentally and physically ready at all times, leaving no doubt about our nation's will and ability to defend itself. Commanders, First Sergeants, and supervisors are responsible for ensuring all soldiers in their units maintain the highest level of physical fitness. All leaders must plan, conduct, evaluate, and test physical training within their units. As leaders, your example should be a source of confidence and inspiration to your soldiers. A soldier's level of physical fitness has a direct impact on his combat readiness. In other words, if not physically and mentally fit, he/she is not supporting the Army's physical fitness objectives. During this lesson you will learn how to properly monitor unit and individual fitness training programs. This lesson consists of two Student Handouts, Lesson Exercise, and a Solution/Discussion for the Lesson Exercise.

## Inventory of Lesson Materials

Prior to starting this lesson ensure you received all materials (pages, tapes, disks, etc.) required for this Training Support Package. Go to the "**This [TSP or Appendix] Contains**" section, on page two of the TSP and the first page of each Appendix, and verify you have all the pages. If you are missing any material, contact the First Sergeant Course Class Coordinator at the training institution where you will attend phase II FSC-TATS.

## Point of Contact

If you have any questions regarding this lesson, contact the First Sergeant Course Class Coordinator at the training institution where you will attend phase II FSC-TATS.

# PRERESIDENT TRAINING SUPPORT PACKAGE

| | |
|---|---|
| **TSP Number /Title** | P661<br>Monitor Unit and Individual Fitness Training Programs |
| **Effective Date** | JUN 01 |
| **Supersedes TSPs** | P661, Monitor Unit and Individual Fitness Training Programs<br>DEC 99 |
| **TSP User** | This TSP contains a training requirement that you must complete prior to attending phase II, FSC-TATS. It will take you about 4 hours to complete this requirement. |
| **Proponent** | The proponent for this document is U.S. Army Sergeants Major Academy. POC: FSC Course Chief, DSN: 978-8329/8848; commercial: (915) 568-8329/8848. |
| **Comments/ Recommen-dations** | Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to:<br><br>ATTN: ATSS DCF FSC TATS<br>COMDT USASMA<br>BLDG 11291 BIGGS FLD<br>FT BLISS TX 79918-8002 |
| **Foreign disclosure restrictions** | The lesson developer in coordination with the USASMA foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries without restrictions. |

**This TSP Contains**

The following table lists the material included in this TSP:



## SECTION I ADMINISTRATIVE DATA

**Tasks trained**

This lesson trains the tasks listed in the following table(s):

| | |
|---|---|
| **Task number:** | 152-020-0040 |
| **Task title:** | Monitor unit and individual fitness training programs, |
| **Conditions:** | as a first sergeant and given AR 350-41 and FM 21-20, |
| **Standards:** | IAW AR 350-41 and FM 21-20. |
| **Task Proponent:** | U. S. Army Soldier Support Institute |

**Tasks reinforced**

None

**Pre-requisite Lesson(s)**

None

**Clearance and access**

There is no clearance or access requirement for this lesson.

**References** The following table lists reference(s) for this lesson:

| Number | Title | Date | Para No. | Additional Information |
|---|---|---|---|---|
| AR 350-41 | Training in units | Mar 93 | Ch 9 | None |
| FM 21-20 | Physical Fitness Training | 30 Sep 92 | Ch 1-5 & 10 | None |

**Equipment Required** None

**Materials Required** Paper and pencil

**Safety Requirements** None

**Risk Assessment Level** Low

**Environmental Considerations** None

**Lesson Approval** The following individuals reviewed and approved this lesson for publication and incorporation into the First Sergeant Course—The Army Training System.

| Name/Signature | Rank | Title | Date |
|---|---|---|---|
| Kevin L. Graham | MSG | Training Developer | |
| Chris L. Adams | SGM | Chief Instructor, FSC | |
| John W. Mayo | SGM | FSC Course Chief, FSC-TATS | |

## SECTION II INTRODUCTION

**Terminal Learning Objective** At the completion of this lesson, you will--

| | |
|---|---|
| **Action**: | Monitor unit and individual fitness training programs, |
| **Conditions**: | as a first sergeant in a classroom environment, given extracts of AR 350-41(SH-1) and FM 21-20 (SH-2), |
| **Standard**: | Monitored unit and individual fitness training programs IAW SH-1 and SH-2. |

**Evaluation** Before entering phase II FSC-TATS, you will receive the end of Phase I Performance Examination that will include questions based on material in this lesson. On that examination, you must answer at least 70 percent of the questions correctly to achieve a GO.

**Instructional Lead-in** A soldier's level of physical fitness has a direct impact on his combat readiness. In other words, if he is not physically and mentally fit, he is not supporting the Army's physical fitness objectives.

## SECTION III PRESENTATION

**ELO 1**

| | |
|---|---|
| **Action:** | Describe the Army's policy governing physical fitness programs, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-1, |
| **Standard:** | Described the Army's policy governing physical fitness programs IAW SH-1. |

**Learning Step/ Activity (LS/A) 1, ELO 1**

- Read the above ELO.
- Study Student Handout 1 (Appendix C).
- Complete questions 1 thru 8 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for Lesson Exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 2**

| | |
|---|---|
| **Action:** | Describe the general physical fitness provisions contained in FM 21-20, Chapter 1, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-2, |
| **Standard:** | Described the general physical fitness provisions contained in FM 21-20, Chapter 1. |

**LS/A 1, ELO 2**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- Complete questions 9 thru 18 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for lesson exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 3**

| | |
|---|---|
| **Action:** | Describe cardiorespiratory fitness, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-2, |
| **Standard:** | Described cardiorespiratory fitness IAW SH-2. |

**LS/A 1, ELO 3**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- Complete questions 19 thru 23 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for lesson exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 4**

| | |
|---|---|
| **Action:** | Describe muscular endurance and strength, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-2, |
| **Standard:** | Described muscular endurance and strength IAW SH-2. |

**LS/A 1, ELO 4**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- Complete questions 24 thru 35 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for lesson exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 5**

| | |
|---|---|
| **Action:** | Describe flexibility |
| **Conditions:** | as a first sergeant in a classroom environment, given FM SH-2, |
| **Standard:** | Described flexibility IAW SH-2. |

**LS/A 1, ELO 5**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- Complete questions 36 thru 37 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for lesson exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 6**

| | |
|---|---|
| **Action:** | Describe body composition, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-2, |
| **Standard:** | Described body composition IAW SH-2. |

**LS/A 1, ELO 6**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- Complete questions 38 thru 39 of Lesson Exercise 1 (LE-1, Appendix B).
- Compare your responses with the suggested solution found in SLE-1 solution/discussion for lesson exercise 1 (Appendix B).
- If your response does not agree, review the appropriate reference/lesson material.

**ELO 7**

| | |
|---|---|
| **Action:** | Develop a unit physical fitness program, |
| **Conditions:** | as a first sergeant in a classroom environment, given SH-2, |
| **Standard:** | Developed a unit physical fitness program IAW SH-2. |

**LS/A 1, ELO 7**

- Read the above ELO.
- Study Student Handout 2 (Appendix C).
- The Army's goal is to ensure that each soldier's physical ability is adequate so he can survive and win on the battlefield. You, as leaders, must understand all aspects of physical performance. However, you must be aware of the risks involved with physical training. You should plan wisely to minimize injuries and accidents. A first sergeant must be able to apply the principles of exercise and the **FITT** factors in order to develop a sound physical fitness program that will enable his soldiers to accomplish the overall mission.
- There are seven steps in planning and developing your unit's fitness program. Chapter 10, FM 21-20 describes and illustrates the necessary steps necessary to develop a strong fitness program. Utilize the illustrations and develop a four-week physical fitness program for your unit.
- Complete LE-2 (Appendix B).
- Bring your completed PE with you to the Phase II portion of the First Sergeants Course. During Phase II, you will present your PE and discuss it with other students.

Your instructor will provide feedback on how to improve your unit's physical fitness program.

## SECTION IV SUMMARY

**Review/ Summarize Lesson**

Commanders, first sergeants, and supervisors are responsible for ensuring all soldiers in their units maintain the highest level of physical fitness. All leaders must plan, conduct, evaluate, and test physical training within their units. The benefits to be derived from a good physical fitness program are many. It can reduce the number of soldiers on profile and sick call, invigorate training, and enhance productivity and mental alertness. As leaders, your physical fitness should be a source of confidence and inspiration to your soldiers.

**Check on Learning**

The Lesson Exercise in Appendix B serves as the Check on Learning.

**Transition to Next Lesson**

None

## SECTION V STUDENT EVALUATION

**Testing Require-ments**

Before entering phase II FSC-TATS, you will receive the end of Phase I Performance Examination that will include questions based on material in this lesson. On that examination, you must answer at least 70 percent of the questions correctly to achieve a GO.

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## SECTION VI STUDENT QUESTIONNAIRE

**Directions** Complete the following blocks:

- Enter your name, your rank, and the date you complete this questionnaire.

| Name: | Rank: | Date: |
|---|---|---|
| | | |

- Answer items 1 through 6 below in the space provided.
- Fold the questionnaire so the address for USASMA is visible.
- Print your return address, add postage, and mail.

Note: Your response to this questionnaire will assist the Academy in refining and improving the course. When completing the questionnaire, answer each question frankly. Your assistance helps build and maintain the best Academy curriculum possible.

| | |
|---|---|
| **Item 1** | Do you believe you have met the learning objectives of this lesson? |
| **Item 2** | Was the material covered in this lesson new to you? |
| **Item 3** | Which parts of this lesson were most helpful to you in learning the objectives? |
| **Item 4** | How could we improve the format of this lesson? |
| **Item 5** | How could we improve the content of this lesson? |
| **Item 6** | Do you have additional questions or comments? If you do, please list them here. You may add additional pages if necessary |

| |
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| |

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# Appendix B

# Index of Lesson Exercises and Solutions

**This Appendix Contains**

This Appendix contains the items listed in this table--

# LESSON EXERCISE 1

## MONITOR UNIT AND INDIVIDUAL FITNESS TRAINING PROGRAM

**Reference Materials/ Solutions**

Do not use any reference material or refer to the solution when you complete the items in this lesson exercise (LE). Write your answer in the space provided.

**General**

- This is a self-graded exercise.
- It should take you approximately 45 minutes to complete the LE. It should take you about 15 minutes to self-grade the LE using the SLE-1-1 thru SLE-1-8, SH-1 (Extract of AR 350-41), and SH-2 (extract of FM 21-20).

**Item 1**

What is the objective of the Army physical fitness program?

_____
_____
_____
_____
_____
_____

**Item 2**

What criteria do you use to measure the Army's physical fitness program objective?

_____
_____
_____
_____
_____
_____

**Item 3**

To whom does the Army's physical fitness policy apply?

_____
_____
_____
_____
_____

**Item 4**

Who is responsible for establishing and conducting physical fitness programs consistent with AR 350-41, FM 21-20, and unit missions?

_____
_____
_____

**Item 5** Can the commander set APFT standards that exceed the minimum standards?

**Item 6** Under what condition may the commander set a higher standard?

**Item 7** How should units design special programs appropriate for soldiers who have difficulty meeting unit or Army standards?

**Item 8** What can competitive, intramural sports programs do for your unit's physical fitness program?

**Item 9** What are some of the leadership responsibilities concerning physical fitness?

**Item 10** What are the five components of fitness?

**Item 11** What are the seven principles of exercise?

**Item 12** What does the acronym F I T T mean?

**Item 13** Why is it important to conduct warm-up exercises before PT and cool-down exercises after PT?

**Item 14** What should warm-up and cool-down activities include?

**Item 15** What are the three phases of fitness conditioning?

**Item 16** What are the types of fitness programs?

**Item 17** Should age be a factor in physical fitness?

**Item 18** What are the two APFT categories of testing for all military personnel?

**Item 19** What exactly is cardiorespiratory fitness/endurance?

**Item 20** How does frequency apply to aerobic training?

**Item 21** What does intensity represent during aerobic training?

**Item 22** What do we mean by time in relation to aerobic training?

**Item 23** What do we mean by type in relation to aerobic training?

**Item 24** What is muscular strength?

**Item 25** What is muscular endurance?

**Item 26** What is an isometric contraction?

**Item 27** What is an isotonic contraction?

**Item 28** What is an isokinetic contraction?

**Item 29** What do we mean by overload with respect to exercising?

**Item 30** What do we mean by the principle progression?

**Item 31** What is specificity?

**Item 32** What do we mean by regularity?

**Item 33** What do we mean by recovery?

**Item 34** What is balance?

**Item 35** What do we mean by variety?

**Item 36** What is the purpose of each of the four categories of stretching techniques?

**Item 37** What is the purpose of the warm-up exercise?

**Item 38** What factors influence the body composition?

**Item 39** What type of exercise is best for burning fat?

# SOLUTION/DISCUSSION FOR LESSON EXERCISE 1

## MONITOR UNIT AND INDIVIDUAL FITNESS TRAINING PROGRAM

**Item 1** What is the objective of the Army physical fitness program?

**Answer:** The objective is to enhance combat readiness by developing and sustaining a high level of physical fitness in soldiers.

Ref: SH-1-3, para 9-3, ELO 1

**Item 2** What criteria do you use to measure the Army's physical fitness program objective?

**Answer:** Cardiorespiratory endurance, muscular strength and endurance, flexibility, anaerobic conditioning, competitive spirit, the will to win, unit cohesion, self-discipline, body fat composition IAW 600-9, healthy lifestyle, and ability to cope with psychological stress.

Ref: SH-1-3, para 9-3, ELO 1

**Item 3** To whom does the Army's physical fitness policy apply?

**Answer:** It applies to all soldiers Army-wide.

Ref: SH-1-3, para 9-4a, ELO 1

**Item 4** Who is responsible for establishing and conducting physical fitness programs consistent with AR 350-41, FM 21-20, and unit missions?

**Answer:** Commanders and supervisors are responsible for establishing and conducting physical fitness programs.

Ref: SH-1-3, para 9-4c, ELO 1

**Item 5** Can the commander set APFT standards that exceed the minimum standards?

**Answer:** Yes; however, the standards must be achievable safely through the use of normal training time and adhere to the principles as outlined in FM 21-20, p 1-15.

Ref: SH-1-4, para 9-6b, ELO 1

**Item 6** Under what condition may the commander set a higher standard?

**Answer:** Commanders may establish higher standards when their unit missions require soldiers to be more than minimally fit.

Ref: SH-1-4, para 9-6b, ELO 1

**Item 7** How should units design special programs appropriate for soldiers who have difficulty meeting unit or Army standards?

**Answer:** They must design the programs to build up soldiers, not tear them down. Special programs must also meet individual needs to overcome specific weaknesses and should encourage a healthy lifestyle behavior.

Ref: SH-1-4, para 9-6d, ELO 1

**Item 8** What can competitive, intramural sports programs do for your unit's physical fitness program?

**Answer:** They can compliment unit fitness programs, build esprit de corps, teamwork, and morale.

Ref: SH-1-4, para 9-6f, ELO 1

**Item 9** What are some of the leadership responsibilities concerning physical fitness?

**Answer:** The leadership responsibilities concerning physical fitness are:

- Leaders must understand and practice new Army doctrine of physical fitness.
- Leaders must be visible and active participants in physical training programs.
- Leaders must clearly emphasize and explain the objectives of the program.
- Leaders should continually assess their units.
- Leaders should not punish soldiers who fail to perform to standard.
- Leaders must plan special training to help soldiers who need it.

Ref: SH-2, p 2-3, (FM 21-20, p 1-4), ELO 2

**Item 10** What are the five components of fitness?

**Answer:** The five components of fitness are:

- Cardiorespiratory (CR) Endurance
- Muscular Strength
- Muscular Endurance
- Flexibility
- Body Composition

Ref: SH-2, p 2-5, (FM 21-20, p 1-3), ELO 2

**Item 11** What are the seven principles of exercise?

**Answer:** The seven principles of exercise are:

- Regularity
- Progression
- Balance
- Variety
- Specificity
- Recovery
- Overload

Ref: SH-2, p 2-5 & 2-6, (FM 21-20, p 1-4), ELO 2

**Item 12** What does the acronym F I T T mean?

**Answer:** The acronym FITT stands for the following:

- Frequency
- Intensity
- Time
- Type

Ref: SH-2, p 2-6 thru 2-8, (FM 21-20, p 1-4), ELO 2

**Item 13** Why is it important to conduct warm-up exercises before PT and cool-down exercises after PT?

**Answer:** Warm-ups may help prevent injuries and maximize performance. Cool-downs gradually slow the heart rate and help prevent pooling of the blood in the legs and feet.

Ref: SH-2, p 2-8, (FM 21-20, p 1-7), ELO 2

**Item 14** What should warm-up and cool-down activities include?

**Answer:** Warm-up and cool-down activities should include the following:

- Warm-Up: Jogging in place or slow jogging, stretching, and calisthenics.
- Cool-Down: Walk and stretch until heart rate returns to less than 100 beats per minute (BPM).

Ref: SH-2, p 2-8, (FM 21-20, Pages 1-7, 4-2, and 4-3), ELO 2

**Item 15** What are the three phases of fitness conditioning?

**Answer:** The three phases of fitness conditioning are: The preparatory, conditioning, and maintenance phases.

Ref: SH-2, p 2-8 thru 2-10, (FM 21-20, p 1-7 thru 1-9), ELO 2

**Item 16** What are the types of fitness programs?

**Answer:** Unit, individual, and special programs

Ref: SH-2, p 2-10 thru 2-12, (FM 21-20, p 1-9 thru 1-11), ELO 2

**Item 17** Should age be a factor in physical fitness?

**Answer:** Yes, because people undergo many changes as they get older.

Ref: SH-2, p 2-13, (FM 21-20, p 1-14), ELO 2

**Item 18** What are the two APFT categories of testing for all military personnel?

**Answer:** The two APFT categories of testing are: Initial entry training (IET) and the Army standard.

Ref: SH-2, p 2-14 & 2-15, (FM 21-20, p 1-14), ELO 2

**Item 19** What exactly is cardiorespiratory fitness/endurance?

**Answer:** It is a condition in which the body's cardiovascular and respiratory systems function together to ensure that adequate oxygen is supplied to the working muscles to produce energy.

Ref: SH-2, p 2-16, (FM 21-20, p 2-0), ELO 3

**Item 20** How does frequency apply to aerobic training?

**Answer:** Frequency refers to how often a person exercises. It relates to the intensity and duration of the exercise session.

Ref: SH-2, p 2-17, (FM 21-20, p 2-1), ELO 3

**Item 21** What does intensity represent during aerobic training?

**Answer:** It represents the degree of effort with which one trains and is probably the single most important factor for improving performance.

Ref: SH-2, p 2-17, (FM 21-20, p 2-2), ELO 3

**Item 22** What do we mean by time in relation to aerobic training?

**Answer:** Time, or duration, refers to how long one exercises.

Ref: SH-2, p 2-20, (FM 21-20, p 2-6), ELO 3

**Item 23** What do we mean by type in relation to aerobic training?

**Answer:** Type, refers to the kinds of aerobic exercises that require breathing in large volumes of air to improve cardiorespiratory (CR) fitness. Some examples are running, bicycling, and stair climbing.

Ref: SH-2, p 2-20 thru 2-21, (FM 21-20, p 2-6), ELO 3

**Item 24** What is muscular strength?

**Answer:** Muscular strength is the greatest amount of force a muscle or muscle group can exert in a single effort.

Ref: SH-2, p 2-22, (FM 21-20, p 3-1), ELO 4

**Item 25** What is muscular endurance?

**Answer:** Muscle endurance is the ability of a muscle or muscle group to do repeated contractions against a less-than-maximum resistance for a given time.

Ref: SH-2, p 2-22, (FM 21-20, p 3-1), ELO 4

**Item 26** What is an isometric contraction?

**Answer:** Isometric contraction produces contraction but no movement, as in pushing against a wall. This produces force with no change in the angle of the joint.

Ref: SH-2, p 2-22, (FM 21-20, p 3-1), ELO 4

**Item 27** What is an isotonic contraction?

**Answer:** Isotonic contraction causes a joint to move through a range of motion against a constant resistance.

Ref: SH-2, p 2-22, (FM 21-20, p 3-1), ELO 4

**Item 28** What is an isokinetic contraction?

**Answer:** Isokinetic contraction causes the angle at the joint to change at a constant rate.

Ref: SH-2, p 2-22, (FM 21-20, p 3-1), ELO 4

**Item 29** What do we mean by overload with respect to exercising?

**Answer:** The overload principle is the basis for all exercise training programs. For a muscle to increase in strength, we must increase its workload beyond what it normally experiences.

Ref: SH-2, p 2-23, (FM 21-20, p 3-2), ELO 4

**Item 30** What do we mean by the principle progression?

**Answer:** When a muscle receives an overload, it adapts by becoming stronger and/or improving its endurance.

Ref: SH-2, p 2-24, (FM 21-20, p 3-4), ELO 4

**Item 31** What is specificity?

**Answer:** Resistance to the specific muscle groups that need strengthening.

Ref: SH-2, p 2-25, (FM 21-20, p 3-4), ELO 4

**Item 32** What do we mean by regularity?

**Answer:** One must do exercise regularly to produce a training effect. Sporadic exercise may do more harm than good.

Ref: SH-2, p 2-25, (FM 21-20, p 3-4), ELO 4

**Item 33** What do we mean by recovery?

**Answer:** Consecutive days of hard resistance training for the same muscle group can be detrimental. The muscles must have sufficient recovery time to adapt. There should be at least a 48-hour recovery period between workouts for the same muscle group.

Ref: SH-2, p 2-25, (FM 21-20, p 3-5), ELO 4

**Item 34** What is balance?

**Answer:** Inclusion of exercises that work all the major muscle groups in both the upper and lower body.

Ref: SH-2, p 2-25, (FM 21-20, p 3-5), ELO 4

**Item 35** What do we mean by variety?

**Answer:** A major challenge for all fitness training programs is maintaining interest and enthusiasm. A poorly designed program can be boring. By using different equipment, changing the exercises, and altering the volume and intensity of the exercise, variety is then present.

Ref: SH-2, p 2-26, (FM 21-20, p 3-5), ELO 4

**Item 36** What is the purpose of each of the four categories of stretching techniques?

**Answer:** The purpose of each of the four categories of stretching techniques is:

- Static: gradually lengthens muscles and tendons as a body part moves around a joint.
- Passive: involves using a partner to help him/her stretch.
- PNF: uses neuromuscular patterns of each muscle group to improve flexibility.
- Ballistic: involves movements of bouncing and bobbing to attain a greater range of motion and stretch.

Ref: SH-2, p 2-27, (FM 21-20, p 4-1 and 4-2), ELO 5

**Item 37** What is the purpose of the warm-up exercise?

**Answer:** The warm-up exercises increase the flow of blood to the muscles and tendons, thus helping reduce the risk of injury.

Ref: SH-2, p 2-28, (FM 21-20, p 4-2), ELO 5

**Item 38** What factors influence the body composition?

**Answer:** Age, diet, fitness level, and genetic factors

Ref: SH-2, p 2-30, (FM 21-20, p 5-0), ELO 6

**Item 39** What type of exercise is best for burning fat?

**Answer:** Aerobic exercises are the best exercises that will burn excess fat. Examples of aerobic exercises include jogging, walking, swimming, bicycling, cross-country skiing, and rowing.

Ref: SH-2, p 2-31, (FM 21-20, p 5-1), ELO 6

**Review/ Summary** FM 21-20 outlines various types of programs for units with different missions. First Sergeants should make every effort to design and tailor programs according to what their soldiers may be expected to do in combat. Conditioning for combat readiness must be the focus of all Army physical fitness programs. What you learned in this lesson will give you the tools to assist your commander in developing an effective fitness program for your unit. First priority is to conduct a fitness program that will enhance the soldiers' ability to complete those tasks that support the unit's METL Secondary importance is preparation for the APFT.

# LESSON EXERCISE 2

## MONITOR UNIT AND INDIVIDUAL FITNESS TRAINING PROGRAMS

1. SAFETY REQUIREMENTS: None.

2. RISK ASSESSMENT LEVEL: Low.

3. ENVIRONMENTAL CONSIDERATIONS: None.

4. EVALUATION: Your instructor will review your unit-training plan for content and completeness based upon the requirements.

5. RESOURCE REQUIREMENTS: Paper, pencil, SH-2 or FM 21-20.

6. SPECIAL INSTRUCTIONS: Read and study Chapter 10 in SH-2, pages 2-27 through 2-42 or Chapter 10 in FM 21-20. This chapter explains and illustrates the development of a unit's physical fitness training plan. Use the illustrations in figures 10-1 thru 10-4 to help you set up a four-week physical fitness training plan. You must turn in your completed LE to your instructor during the resident phase (Phase II) of the First Sergeants Course-TATS. Your instructor will review and provide feedback on how to improve your fitness program. Since this is a subjective type lesson exercise, there is no concrete answer because the unit's mission and the unit Mission Essential Task List (METL) drive the physical fitness program selected.

7. MOTIVATOR: As a First Sergeant, one of your requirements is to establish, monitor, and conduct a physical fitness program that is consistent with AR 350-41, FM 21-20, and your unit's mission. The program should include sufficient intensity, duration, and frequency to maintain adequate cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition. A good physical fitness program, enables your soldiers to accomplish their mission and help increase their APFT scores.

## SECTION II

REQUIREMENTS: Use the sample training program in Student Handout 2, figures 10-1 thru 10-4 to help you design a four-week (or month for RC) unit physical fitness training program that supports your current unit mission and includes the following:

a. Your unit mission (SH-2, p 2-33, or FM 21-20, p 10-1).

b. A unit goal statement (SH-2, p2-33, or FM 21-20, p 10-1).

c. The method used to assess the unit's overall fitness (SH-2, 2-33, or FM 21-20, p 10-1 and 10-2).

d. The **FITT** factors (SH-2, p 2-6, or FM 21-20, pages 1-4 thru 1-7).

e. The principles of exercise (SH-2, p 2-5 thru 2-6, or FM 21-20, p 1-4).

f. The phases of fitness (SH-2, p 2-9 thru 2-11, or FM 21-20, 1-7).

NAME/RANK_____

| FOUR-WEEK (MONTH) TRAINING PLAN | | | | |
|---|---|---|---|---|
| AUGUST | | | | |
| **MONDAY (JANUARY)** | **TUESDAY (FEBRUARY)** | **WEDNESDAY (MARCH)** | **THURSDAY (APRIL)** | **FRIDAY (MAY)** |
| | | | | |

# Appendix C

## Index of Student Handouts

**This Appendix Contains**

This Appendix contains the items listed in this table--

| Title/Synopsis | Pages |
|---|---|
| SH-1, Extract of AR 350-41, Ch 9 | SH-1-1 thru SH-1-8 |
| SH-2, Extract of FM 21-20, Ch 1-5 and 10 | SH-2-1 thru SH-2-43 |

# Student Handout 1

**This Student Handout Contains**

The following extract consists of seven pages of text downloaded from the Army Doctrine and Training Digital Library (ADTDL), from AR 350-41, Training in Units, dated 19 March 1993, Chapter 9.

**Chapter 9**

**Physical Fitness**

**9.1 Overview**
This chapter prescribes policies and procedures for the Army Physical Fitness Program.

**9.2 Program implementation**
a. Office of the Deputy Chief of Staff for Operations and Plans establishes policy governing the Army Physical Fitness Program.
b. Office of the Deputy Chief of Staff for Personnel --
(1) Provides policy guidance for the Army Health Promotion Program, which encompasses a variety of activities to improve and protect health.
(2) Promotes the use of incentive awards to encourage maximum levels of fitness and health.
(3) Provides policy guidance on the Army Body Composition/Weight Control Program, the Army Alcohol and Drug Abuse Program, and the Tobacco Cessation Program.
c. Office of The Surgeon General --
(1) Provides guidance and advice in all medical, physiological, and health areas related to physical fitness. These areas will include nutrition, weight standards, stress management, injury preventions, control of substance abuse, smoking cessation, and the identification and modification of cardiovascular risk factors.
(2) Provides support for and conducts medical research in physical fitness to include the physiology of exercise, work performance, injury prevention, soldier performance, nutrition, and other medically related areas.
(3) Manages the Cardiovascular Screening Program for all personnel age 40 or older. Individualized exercise prescriptions for those soldiers who have been sedentary or who have cardiovascular risk factors will be provided by the physician performing the CVSP.
(4) Coordinates all pertinent information related to physical training with Office of the DCSOPS.
d. National Guard Bureau prescribes appropriate policy and programs for physical fitness in the Army National Guard and encourages State adjutants general to develop programs that ensure compliance with these regulations.
e. U.S. Army Community and Family Support Center ensures the Army's sports and recreational programs and facilities support physical fitness objectives.
f. TRADOC --
(1) Maintains a school to develop and field the Army's physical fitness doctrine, training, education programs, and performance standards.
(2) Acts as proponent for coordinating, publishing, and issuing all physical fitness training doctrine and aids to support the Army Physical Fitness Program.
(3) Conducts training for master fitness trainers when resourced by HQDA.
(4) Approves all programs of instruction for training conducted by the Army Physical Fitness School.
(5) Ensures record APFT is part of leader development school programs of PLDC, BNCOC, ANCOC, Battle Staff NCO Course, First Sergeant Course (FSC), Sergeant Major Course (SMC), Senior Warrant Officer Training (SWOT), Officer Basic Course (OBC), Officer Advanced Course (OAC), Combined Arms and Services Staff School (CAS3), and Command and General Staff Officer Course (CGSOC).
(6) Conducts research and assistance visits at units and installations Army-wide, as directed by ODCSOPS, to provide recommendations for improvement of total fitness in the Army.
(7) Coordinates the inclusion of related programs into physical fitness training and educational programs when appropriate. These programs include the following:
(a) The Army Sports Program. (See AR 215-1.)
(b) The Army Composition/Weight Control Program. (See AR 600-9.)
(c) The Army Alcohol and Drug Abuse Program. (See AR 600-85.)
(d) Nutritional standards. (See AR 40-25.)
(e) The Army Health Promotion Program. (See AR 600-63.)
(8) Provides educational programs in physical fitness for use in Army professional development courses (resident and nonresident).
(9) Develops challenging, safe, and effective physical training programs for use in both the training base and units.
(10) Maintains statistical data on the physical fitness performance of soldiers in initial entry training (IET) and military personnel in resident training courses and develops reporting systems as appropriate.
(11) Develops and maintains an appropriate Army data base to monitor the physical fitness test scores of officers, warrant officers, and enlisted personnel by age and sex category.
g. AMC maintains statistical data on the physical fitness test scores of military personnel in AMC resident training courses.
h. Academy of Health Sciences maintains statistical data on the physical fitness test scores of soldiers in medical advanced individual training (AIT) courses of instruction and military personnel in resident courses or

other training programs.

i. Army War College --

(1) Conducts applied fitness research relating to the health and fitness of senior (40 and over) military personnel.

(2) Conducts fitness educational and training programs for Army War Training in Units College personnel, to include conducting the record Army physical fitness test (APFT) for students, as required.

(3) Initiates, coordinates, monitors, and summarizes applied field research in physical fitness as directed by ODCSOPS.

(4) Monitors, assimilates, and transposes for Army use physical fitness related research conducted in the civilian community.

(5) Evaluates new techniques and concepts for potential use or incorporation into Army doctrine and programs.

(6) Provides TRADOC with technical support and backup relating to applied physical fitness research.

(7) Ensures all research is coordinated with the Army Medical Research Command and the U.S. Army Physical Fitness School.

j. Office of the Chief, Army Reserve in coordination with FORSCOM, USARPAC, USARSO, USAREUR, USASOC, and ARPERCEN prescribes appropriate policy and programs for physical fitness in the U.S. Army Reserve according to the provisions of this regulation.

k. Major Army commands implement the policy and procedures outlined in this regulation.

l. United States Military Academy --

(1) Provides ODCSOPS technical advice based upon research and programs conducted with the Corps of Cadets.

(2) Conducts TRADOC-approved Master Fitness Trainer Program.

**9.3 Objective**

The objective of the Army Physical Fitness Program is to enhance combat readiness by developing and sustaining a high level of physical fitness in soldiers as measured by the following criteria:

a. Cardiorespiratory endurance.

b. Muscular strength and endurance.

c. Flexibility.

d. Anaerobic conditioning.

e. Competitive spirit, the will to win, and unit cohesion.

f. Self-discipline.

g. Body fat composition as prescribed by AR 600-9.

h. A healthy lifestyle that includes good nutrition, avoidance of smoking, and avoidance of drug use.

i. Ability to cope with psychological stress.

**9.4 Physical fitness policy**

a. Physical fitness policy applies Army-wide. It includes all soldiers, all functional branches, all units, and all operating agencies.

b. Physical fitness provides a foundation for combat readiness and must be an integral part of every soldier's life. Unit readiness begins with the physical fitness of soldiers and the noncommissioned officers and officers who lead them. All officers and noncommissioned officers responsible for planning, conducting, and evaluating physical training and testing will be familiar with the principles, procedures, and guidelines in FM 21-20, the Army's official doctrinal publication for training and testing physical fitness.

c. Commanders and supervisors will establish and conduct physical fitness programs consistent with this regulation, FM 21-20, and unit missions. Exercise periods will be conducted with sufficient intensity, frequency, and duration to maintain adequate cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition.

d. Soldiers are expected to meet the standards set forth in this regulation and FM 21-20. Soldiers who are unable to meet physical fitness testing standards or the mission-related physical fitness standards required of their units may be subjected to administrative action.

**9.5 Physical fitness training policy**

a. All personnel in the active Army, the ARNG, and the USAR will take part in either collective or individual physical fitness training programs year-round. Active Army units, individuals, and full-time Guardsman and Reservists will conduct regularly-scheduled (at least 3 to 5 times per week) vigorous physical fitness training during the unit's normal duty-day (the duty-day is determined by installation commanders).

b. ARNG and USAR commanders incorporate mission and readiness-enhancement physical fitness training into appropriate inactive duty training periods.

c. Personnel will be excused from physical fitness training only during periods of temporary or permanent medical limitations established according to AR 40-501. Personnel who cannot take part in physical fitness training because of a valid profiled condition will be placed in rehabilitative programs, designed by health care personnel within profile guidelines, and supervised by the commander.

d. All soldiers age 40 and over will be evaluated for coronary heart disease risk factors as part of their periodic physical examination. The medical procedures for the Cardiovascular Screening Program are outlined in AR 40-501. It is the soldier's responsibility to ensure that the CVSP is conducted in a timely manner, as close to the 40th birthday as possible, and as promptly as medical facilities permit.

e. All AC lieutenant colonel and colonel command selects and Command Sergeant Major (CSM) designees, regardless of age, must be cleared by a CVSP, meet body fat standards set forth in AR 600-9, and pass the APFT before assuming command or assignment to a CSM position. A CVSP clearance granted during the soldier's last periodic physical examination is considered sufficient to meet the CVSP requirement.

**9.6 Procedures in units**

a. As a first priority, commanders will conduct physical fitness programs that enhance soldiers' ability to complete critical soldier or leader tasks that support the unit's METL. Preparation for the APFT is of secondary importance. Maintenance of the military skills listed below will also be emphasized.

(1) Agility, to include fast movement in enclosed spaces (sprinting and lateral movement).

(2) Balance and controlling fear of heights.

(3) Vaulting, jumping, and landing correctly.

(4) Forced marching with loads, to include cross-country movement.

(5) Strength development activities such as rope climbing, pull ups, and resistance exercises.

(6) Crawling.

(7) Negotiation of natural and man-made obstacles (confidence and obstacle courses).

b. Commanders may establish unit APFT standards which exceed Army minimum standards; however, the standards must be able to be achieved safely through the use of normal training time and adherence to the principles of conditioning outlined in FM 21-20. Personnel who meet Army minimum standards, but fail to meet unit standards, may not be punished or disciplined; however, they may be candidates for special programs (see d below) which focus on overcoming weakness. Commanders who establish higher standards should do so because their unit missions require soldiers to be more than minimally fit. Like-units with identical missions (companies within battalions, battalions within brigades) should have similar standards. Care should be taken by the chain of command to ensure unit standards do not arbitrarily replace the Army standards.

c. Physical performance requirements are inherent in many of the tasks listed in the soldier's manual for each MOS. The ability to perform essential MOS physical job tasks is one of the criteria for graduation from IET. Soldiers in units must maintain physical fitness proficiency as part of their overall MOS proficiency.

d. Special programs are appropriate for soldiers who have difficulty meeting unit or Army standards. Such programs will not be punitive in nature; they must be designed to build up soldiers, not tear them down. (Additional conditioning is not a substitute for smart, tailored conditioning.) Special programs will also be designed to meet individual needs to overcome specific weaknesses (such as aerobic or strength deficiency). In addition, they should encourage healthy lifestyle behavior.

e. Special physical fitness programs will be tailored according to FM 21-20 and kept separate and distinct from the Army Body Composition/Weight Control Program, except for the exercise programs prescribed to assist soldiers with weight control problems. It is intended that commanders avoid placing all soldiers that exceed body fat standards or have fitness problems into the same category with the expectation that more exercise will automatically result in decreased body fat. A soldier who exceeds body fat standards may be able to pass the APFT, while a very thin soldier may be unable to pass the APFT. One special program for both soldiers is obviously not appropriate. Special programs will be employed to the greatest extent possible for soldiers with physical fitness problems. These programs will not be used to discipline soldiers who may have attitude problems toward physical exercise. Master fitness trainers, if available, should be used to develop special programs.

f. Competitive, intramural sports programs should complement unit physical fitness programs and be used to build esprit de corps, teamwork, and morale. Unit sports activities, however, must be rigorous enough to develop some or all of the physical fitness components outlined in paragraph 9-3 to be of benefit. They should not be substituted for a formal program of physical conditioning.

g. The following provides general guidance for safe and sound physical exercise. Any aerobic activity which results in soldiers maintaining their training heart rate, as described in FM 21-20, chapter 2, for a minimum of 20 minutes, 3 to 5 times per week, is adequate to maintain cardiorespiratory fitness. The intensity of each cardiorespiratory exercise session should be adjusted based on the training objective for that session. Physical training aimed at improving a soldier's muscular strength and endurance should consist of multiple sets of timed exercises. Exercises are continued until temporary muscle failure (until the individual cannot complete another correct repetition). Muscular strength and endurance sessions should be conducted a minimum of 3 times per week. Detailed guidance is provided in FM 21-20, chapter 3.

h. FM 21-20 outlines various types of programs for units with different missions. Commanders should make every effort to design and tailor programs according to what their soldiers may be expected to do in combat. Running has always been regarded as one of the best aerobic activities; however, unless running programs are balanced with strength, muscular endurance, and load bearing exercise, or exercise related to the unit mission, they are inadequate. Road

marches with combat loads are excellent conditioners, as are pull-ups, obstacle courses, and other traditional soldier fitness activities. Conditioning for combat readiness must be the focus of all Army physical fitness programs.

i. Physiological differences, as well as unit and individual missions, must be considered when designing programs involving soldiers of both sexes. Despite the level of conditioning, cardiorespiratory and muscular strength differences between men and women are significant. For example, women generally have to exert more effort to maintain the same pace or to do the same amount of work as men. Commanders will practice the principles outlined in FM 21-20 and apply them to maximize unit and individual soldier development. Soldiers who are pregnant or who are recovering from childbirth will not participate in unit physical fitness programs or testing until cleared by their physician or physician's assistant.

j. Commanders should use FM 21-20, DA Pam 350-15, DA Pam 350-18, DA Pam 350-21, and DA Pam 350-22 to help develop programs for soldiers. These publications provide excellent material to design and tailor programs for soldiers in all kinds of assignments.

k. Master fitness trainers are soldiers who have completed an approved master fitness training course or a special program at the United States Military Academy. These soldiers have received intensive training in scientific elements of physical fitness and will be used by commanders as special staff assistants to design and maintain unit programs.

**9.7 Procedures for individual programs**

a. In certain duty assignments (for example, staff or shift work) and in the ARNG and USAR, highly structured, collective programs are not always practical. Therefore, individually scheduled personal fitness programs should be emphasized and time during the duty day authorized for workouts. RC commanders and supervisors will encourage physical fitness programs for their soldiers during nonduty hours to the greatest extent possible. Guidelines for individual programs are outlined in FM 21-20.

b. All soldiers must maintain a minimum level of overall physical fitness despite job position. Commanders and supervisors will provide adequate time during the duty day, or during shift work, if appropriate and possible, to allow soldiers to maintain a vigorous physical fitness program. As a minimum, such a program will allow for at least 30 minutes of intense exercise at least 3 times per week, plus adequate time for changing, showers, and recovery.

**9.8 Physical fitness testing procedures**

The purpose of physical fitness testing is to give soldiers an incentive to stay in good physical condition and allow commanders a means of assessing the general fitness levels of their units.

a. Physical fitness testing will not form the foundation of unit or individual fitness programs; it is simply one element of a total program. Fitness testing is designed to ensure the maintenance of a base level of physical fitness essential for every soldier in the Army, regardless of MOS or duty assignment. Unit programs must be designed to take this base level of conditioning and raise it to help meet or exceed mission-related physical performance tasks.

b. TRADOC develops physical fitness test standards and ODCSOPS approves them. The APFT provides a measure of cardiorespiratory and upper and lower body muscular endurance. It is a performance test that indicates a soldier's ability to perform physically and handle his or her own body weight. Standards are adjusted for age and physiological difference between men and women. The APFT consists of push-ups, sit-ups, and a 2-mile run, done in that order on the same day. For profiled soldiers, a record test must include an aerobic event. The only approved aerobic events are the 2-mile run, 800-yard swim, 6.2-mile bike ride (stationary or track), or the 2.5-mile walk. Testing is prescribed for all soldiers as follows:

(1) The intent of the APFT in the Army Physical Fitness Program is to provide an assessment of the physical fitness training program. Temporary training periods solely devoted toward meeting APFT requirements are discouraged. Active Army soldiers and Active Guard/Reserve will take the APFT at least twice each year with a minimum of 4 months separating record tests, if only two record tests are given.

(2) Commanders may administer the APFT as often as they wish (for record or practice); however, they must specify beforehand when the results are for record purposes. Intent is for physical fitness programs to sustain adequate physical fitness. Accordingly, all soldiers (active, Guard, and Reserve) should be able to take and pass the APFT at any time. The APFT is the commander's tool for measuring minimum physical fitness. He may use that tool as often as necessary to ensure the unit is maintaining minimum physical fitness standards.

(3) Personnel with medical profiles that preclude taking the push-up or sit-up event, or both, will take the remaining events, if a physician or physician's assistant approves. The 2-mile run event, however, or an approved alternate test event as outlined in FM 21-20, must be taken if the test is to count for record. The alternate test is primarily designed for soldiers with permanent physical profiles which preclude them from taking the 2-mile run; however, soldiers with temporary profiles of long duration (more than 3 months) may also take an alternate test if approved by the commander after input from health care personnel. Alternate test

events and their administration are outlined in FM 21-20. Soldiers must be given 3 months to prepare for the alternate test from either the date of the profile or the date recommended by health care personnel.

(4) Soldiers who fail a record APFT for the first time or fail to take the APFT within the required period will be flagged according to AR 600-8-2. In the event of a record test failure, commanders may allow soldiers to retake the test as soon as the soldier and the commander feel the soldier is ready. Soldiers without a medical profile will be retested not later than 3 months following the initial APFT failure. RC soldiers, not on active duty and without a medical profile, will be tested no later than 6 months following the initial APFT failure.

(5) Personnel who initially fail the CVSP and are subsequently cleared, will have no more than 179 days of conditioning prior to the requirement to successfully meet the standards of a record APFT.

(6) All soldiers must attain a score of at least 60 points on each test event and an overall score of at least 180 points. Three exceptions are listed below.

(a) Soldiers medically excused from an APFT event or events must attain an APFT score of GO, 60, or 120 points depending on the number of APFT events tested.

(b) Soldiers in basic training must attain 50 points on each event and an overall score of 150, or a score as determined by ODCSOPS in coordination with TRADOC. (This exception does not apply to advanced individual training, one station unit training (OSUT), or leader development schools listed in paragraph 9-2f(5).)

(c) Soldiers awaiting IET may be tested but no formal record of their score will be maintained.

(7) Soldiers in IET will be tested near the end of the course to qualify for completion of basic training, AIT, OSUT, and one station training.

(8) Officer and warrant officer candidates in precommissioning training and officers and warrant officers in initial training courses, such as officer basic courses, will be tested at least once (near the end of their course) and must pass the test to graduate.

(9) Officers, warrant officers, and enlisted personnel attending the following leader development courses must take and pass the APFT in order to graduate: PLDC, BNCOC, ANCOC, FSC, SMC, SWOT, OBC, OAC, CAS3, CGSOC, and AWC. Other courses, with DA approval, may require passing the APFT for either enrollment or graduation.

(10) Personnel in joint, North Atlantic Treaty Organization, Office of the Secretary of Defense, and all other staff assignments are subject to, and will take, the APFT. The senior Army soldier in the organization will conduct the APFT and ensure inclusion of scores in records and performance reports.

(11) ARNG personnel and members of USAR troop program units (TPUs) will take the APFT at least once a year. If only one record test is taken each year, at least 8 months will elapse between record tests, except for make-up testing and retesting of those who failed the test. Retesting will be done according to (4) above.

(12) IMA and IRR soldiers who are on tours of active duty for annual training, active duty training, or active duty special work will be administered the APFT when they are placed on tours of duty 12 or more days in length. The test will be administered to IRR members normally once each year, except for those who failed the test; they will be retested according to (4) above. Members of the IRR and USAR TPUs on extended active duty to fill Army vacancies will comply with para 9-8b(1) above. The commander of the unit or agency to which the IRR member is attached for duty will administer the APFT. Individuals assigned to individual mobilization augmentee positions will comply with policies and programs directed by their assigned commander. All commanders may use the APFT as a diagnostic tool to assess their units at any time; however, they will provide reasonable advance notice to soldiers when an APFT will be administered for record purposes. Soldiers on active duty must comply with policy provisions of this chapter no matter what their status was prior to coming on active duty.

(13) TRADOC sets physical fitness standards for entry into Ranger, Special Forces, Airborne training, and into other schools requiring separate physical fitness standards. The ODCSOPS will review and approve these standards.

(14) Results of the APFT will be recorded on DA Form 705 (Physical Fitness Test Scorecard) which will be maintained for each servicemember. This scorecard will be kept at a central location in the unit and will accompany the individual military personnel records jacket at time of permanent change of station. Units and separate offices will have a system for monitoring performance and progress of their soldiers.

(15) Individuals will be weighed when they take record Army Physical Fitness Tests or at least every 6 months according to AR 600-9.

(16) All soldiers (AC and RC) who reached age 40 before 1 January 1989 will not be tested until medically evaluated and cleared by the CVSP. Uncleared soldiers may continue their current level of exercise during the evaluation process, including participation in unit or individual programs, but they will not be permitted to take the APFT until cleared.

(17) Soldiers (Active and Reserve) who reach age 40 on or after 1 January 1989 are required to take the APFT, unless prohibited by a medical profile. These soldiers will receive their CVSP screening in conjunction with their next periodic physical examination.

**9.9 Incentives and corrective action**

a. Commanders are encouraged to establish incentives and unit physical fitness objectives related to their mission essential tasks. Soldiers who score 290 or above on the APFT and meet body fat standards will be awarded the Physical Fitness Badge for physical fitness excellence according to AR 672-5-1. Commanders are encouraged to commend soldiers who score over 270 points on the APFT for outstanding performance.

b. Soldiers without medical profiles, who repeatedly fail the APFT, will be either barred from reenlistment (AR 601-280, enlisted soldiers) or processed for separation from the service. Provisions for separation are in AR 635-100 (officers) or AR 635-200 (enlisted soldiers) and counterpart ARNG and USAR regulations. (A repetitive failure occurs when a record test is taken and failed, the soldier is provided adequate time and assistance to improve his or her performance, and failure occurs again.) See AR 635-100 for those officers who have incurred a statutory active duty service obligation because of participation in an Army sponsored educational or training program.

**9.10 Safety**

a. FM 21-20 provides guidance for preventing injuries during physical training. Trainers will be alert to signs and symptoms indicating that a soldier's endurance limits have been reached or exceeded, or a serious medical condition exists. These signs and symptoms may include, but are not limited to the following:

(1) Sudden decline in ability to meet previously attained levels of performance.

(2) Excessive shortness of breath, gasping, choking, or other difficulty in breathing.

(3) Light-headedness, faintness, or actual loss of consciousness.

(4) Nausea or vomiting.

(5) Irregularities in heartbeat or palpitations of the heart.

(6) Chest discomfort, including pain, tightness, pressure, constriction, or a feeling of smothering. (Not all chest pains are symptomatic of danger. Those that increase with exercise, however, generally are.)

(7) Cessation of perspiration; hot, dry skin; confusion; or unconsciousness.

(8) Muscle cramps during exercise.

(9) Poor gait,limping, and strains or sprains of feet and legs.

(10) Muscle joint pain.

b. If a trainer detects any of the signs or symptoms in a above, exercises will be stopped and the soldier immediately referred for medical evaluation. Conditions (5) through (8) above are symptoms of cardiovascular injury, heat stroke, or severe respiratory difficulty and should be considered major medical emergencies.

c. Training intensity should be increased slowly so that the body can adapt to previous training. Care must be taken to avoid over-training which can bring on stress fractures, tendonitis, blisters, and muscle soreness. This can result in the loss of training time. Training should begin with appropriate warm-up and stretching and conclude with proper cool-down and stretching.

d. Environmental considerations, particularly weather and altitude, are essential in planning programs. Proper modification to the uniform or changes in exercise activity should be made during conditions of extreme cold or heat. Active encouragement of fluid intake is extremely important in preventing heat injuries. Fluid restrictions during intense exercise in hot conditions increases the likelihood of serious injuries. Water intake will be encouraged before, during, and after exercise. Most persons do not take enough fluids during exercise in hot or cold weather, especially the latter.

e. If a soldier fails to meet the physical fitness standards in FM 21-20, the person's unit commander will remove him or her from parachute, diving, or flight crew status. This action will be taken if in the judgement of the unit commander such action is necessary to ensure the safety of that soldier or other unit members.

**9.11 Sports-related programs**

a. The Army Sports Program should supplement physical fitness programs. Many sports can be used to promote unit esprit de corps, develop a competitive spirit, increase motivation for fitness development, improve physical fitness, and add variety to the unit programs. Obviously, sports such as bowling or golf may be good, relaxing activities that may relieve stress, yet they do little for soldier physical fitness. On the other hand, vigorous sports such as racket games, soccer, swimming, biking, cross-country skiing, and running actually enhance fitness. Commanders must select sports that will enhance their overall program of physical fitness. Competitive fitness activities are outlined in FM 21-20.

b. Commanders are encouraged to plan and conduct unit-level sports activities. Morale, welfare, and recreation organizations and personnel can provide assistance (AR 215-1).

c. Army physical fitness facilities (gymnasiums and swimming pools) may be used in unit training programs, to include the following:

(1) Weight training.

(2) Circuit training.

(3) Hand-to-hand combat.

(4) Swimming and drown-proofing.

d. Commanders and supervisors are encouraged to have their personnel take part in international competitive events. Participation should be used as a way to promote physical fitness at the highest level of competition. Two international competitive events related to military physical fitness are as follows:

(1) The military pentathlon (shooting, obstacle running, grenade throwing, utility swimming, and cross-country running.)

(2) The Inter-allied Confederation of Reserve Officers (known by French acronym CIOR) military skills competition (orienteering, obstacle swimming, shooting, obstacle running, grenade throwing, map reading, and distance estimating).

**9.12 Uniforms**

a. When conducting physical fitness training in unit formations, the commander will prescribe a uniform proper to weather conditions and the type of activity. This can include appropriate components of the athletic ensemble (CTA 50-900) when issued, or it can also include battle or fatigue dress trousers with undershirt or utility shirt. Female soldiers will not be required to wear the undershirt as an outer garment nor will they be required to remove the utility shirt for physical training (AR 670-1). The commander may authorize the wear of individually purchased athletic clothing for unit sports activities or for physical training.

b. Testing standards are designed for soldiers wearing running shoes. Accordingly, running shoes will be worn for physical fitness testing unless individual soldiers elect to wear combat boots.

c. Commanders should advise soldiers on how to select suitable athletic or running shoes. However, they will not require the purchase of a particular color, brand, or style.

d. The preferred shoe for running is the running shoe. However, since soldiers wear boots in combat, some physical training in boots, to include limited running and rapid road marching, may be appropriate. While running in boots may be uncomfortable, there is no definitive research available that shows fitted, comfortable, and well broken-in boots cause injury. Activities conducted in combat boots should progressively increase in duration allowing soldiers to adapt to performing in boots. In combat, soldiers may have to run or force-march over rough terrain. Training in boots will prepare them for those conditions. This guidance is not intended to have the combat boot replace the running shoe for physical training; but it is meant to let soldiers and commanders know the soldier's primary footwear is suitable for limited, periodic physical exercise, as long as the boot fits and is well broken-in. Commanders must consider the experience of their soldiers and their unit missions, when deciding on the footwear for various types of fitness training.

# Student Handout 2

**This Student Handout Contains**

The following extract consists of 42 pages downloaded from the Army Doctrine and Training Digital Library (ADTDL), from FM 21-20, Physical Fitness Training, dated 30 September 1992, Chapters 1 through 5, and 10.
**Note:** "*****" Indicates a break in extracted material.

**PREFACE**

## PREFACE

On 5 July 1950, U.S. troops, who were unprepared for the physical demands of war, were sent to battle. The early days of the Korean were nothing short of disastrous, as U.S. soldiers were routed by a poorly equipped but well trained, North Korean People's Army. As American soldiers withdrew, they left behind wounded comrades and valuable equipment; their training had not adequately prepared them to carry heavy loads.

The costly lessons learned by Task Force Smith in Korea are as important today as ever. If we fail to prepare our soldiers for their physically demanding wartime tasks, we are guilty of paying lip service to the principle of "Train as you fight." Our physical training programs must do more for our soldiers than just get them ready for the semiannual Army Physical Fitness Test (APFT).

FM 21-20 is directed at leaders who plan and conduct physical fitness training. It provides guidelines for developing programs which will improve and maintain physical fitness levels for all Army personnel. These programs will help leaders prepare their soldiers to meet the physical demands of war. This manual can also be used as a source book by all soldiers. FM 21-20 was written to conform to the principles outlined in FM 25-100, Training the Force.

The benefits to be derived from a good physical fitness program are many. It can reduce the number of soldiers on profile and sick call, invigorate training, and enhance productivity. It will improve soldiers' combat readiness.

The proponent of this publication is HQ, TRADOC. Send comments and recommendations on DA Form 2028 (Recommended Changes To Publications and Blank Forms) directly to Headquarters, US Army Infantry Center, US Army Physical Fitness School (ATZB-PF), Fort Benning, GA 31905-5000.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

# CHAPTER 1

# Introduction

A soldier's level of physical fitness has a direct impact on his combat readiness. The many battles in which American troops have fought underscore the important role physical fitness plays on the battlefield. The renewed nationwide interest in fitness has been accompanied by many research studies on the effects of regular participation in sound physical fitness programs. The overwhelming conclusion is that such programs enhance a person's quality of life, improve productivity, and bring about positive physical and mental changes. Not only are physically fit soldiers essential to the Army, they are also more likely to have enjoyable, productive lives. This chapter provides an overview of fitness. It defines physical fitness, outlines the phases of fitness, and discusses various types of fitness programs and fitness evaluation. Commanders and leaders can use this information to develop intelligent, combat-related, physical fitness programs.

Physical fitness, the emphasis of this manual, is but one component of total fitness. Some of the others are weight control, diet and nutrition, stress management, dental health, and spiritual and ethical fitness, as well as the avoidance of hypertension, substance abuse, and tobacco use. This manual is primarily concerned with issues relating directly to the development and maintenance of the five components of physical fitness.

Components of physical fitness include weight control, diet, nutrition, stress management, and spiritual and ethical fitness.

The Army's physical fitness training program extends to all branches of the total Army. This includes the USAR and ARNG and encompasses all ages and ranks and both sexes. Its purpose is to physically condition all soldiers throughout their careers beginning with initial entry training (IET). It also includes soldiers with limiting physical profiles who must also participate in physical fitness training.

Commanders and leaders must ensure that all soldiers in their units maintain the highest level of physical fitness in accordance with this manual and with AR 350-15 which prescribes policies, procedures, and responsibilities for the Army physical fitness program.

## Leadership Responsibilities

Effective leadership is critical to the success of a good physical training program. Leaders, especially senior leaders, must understand and practice the new Army doctrine of physical fitness. They must be visible and active participants in physical training programs. In short, leaders must lead PT! Their example will emphasize the importance of physical fitness training and will highlight it as a key element of the unit's training mission.

Leaders must emphasize the value of physical training and clearly explain the objectives and benefits of the program. Master Fitness Trainers (MFTs), graduates of a special course taught by the U.S. Army Physical Fitness School, can help commanders do this. However, regardless of the level of technical experience MFTs have, the sole responsibility for good programs rests with leaders at every level.

A poorly designed and executed physical fitness program hurts morale. A good program is well planned and organized, has reasonable yet challenging requirements, and is competitive and progressive. It also has command presence at every level with leaders setting the example for their soldiers.

Leaders should also continually assess their units to determine which specific components of fitness they lack. Once they identify the shortcomings, they should modify their programs to correct the weaknesses.

Leaders should not punish soldiers who fail to perform to standard. Punishment, especially excessive repetitions or additional PT, often does more harm than good. Leaders must plan special training to help soldiers who need it. The application of sound leadership techniques is especially important in bringing physically deficient soldiers up to standard.

## COMMAND FUNCTIONS

Commanders must evaluate the effectiveness of physical fitness training and ensure that it is focused on the unit's missions. They can evaluate its effectiveness by participating in and observing training, relating their fitness programs to the unit's missions, and

analyzing individual and unit APFT performance.

Leaders should regularly measure the physical fitness level of every soldier to evaluate his progress and determine the success of the unit's program.

Commanders should assure that qualified leaders supervise and conduct fitness training and use their MFTs, for they have received comprehensive training in this area.

Leaders can learn about fitness training in the following ways:

- Attend the four-week MFT course or one-week Exercise Leaders Course.
- Request a fitness workshop from the Army Physical Fitness School.
- Become familiar with the Army's fitness publications. Important examples include this manual, AR 350-15, and DA Pamphlets 350-15, 350-18, and 350-22.

Commanders must provide adequate facilities and funds to support a program which will improve each soldier's level of physical fitness. They must also be sure that everyone participates, since all individuals, regardless of rank, age, or sex, benefit from regular exercise. In some instances, leaders will need to make special efforts to overcome recurring problems which interfere with regular training.

Leaders must also make special efforts to provide the correct fitness training for soldiers who are physically substandard. "Positive profiling" (DA Form 3349) permits and encourages profiled soldiers to do as much as they can within the limits of their profiles. Those who have been away from the conditioning process because of leave, sickness, injury, or travel may also need special consideration.

Commanders must ensure that the time allotted for physical fitness training is used effectively.

Training time is wasted by the following:

- Unprepared or unorganized leaders.
- Assignment of a group which us too large for one leader.
- Insufficient training intensity: it will result in no improvement.
- Rates of progression that are too slow or too fast.
- Extreme formality that usually emphasizes form over substance. An example would be too many units runs at slow paces or "daily dozen" activities that look impressive but do not result in improvement.
- Inadequate facilities which cause long waiting periods between exercises during a workout and/or between workouts.
- Long rest periods which interfere with progress.

To foster a positive attitude, unit leaders and instructors must be knowledgeable, understanding, and fair, but demanding. They must recognize individual differences and motivate soldiers to put forth their best efforts. However, they must also emphasize training to standard. Attaining a high level of physical fitness cannot be done simply by going through the motions. Hard training is essential.

Commanders must ensure that leaders are familiar with approved techniques, directives, and publications and that they use them. The objective of every commander should be to incorporate the most effective methods of physical training into a balanced program. This program should result in the improved physical fitness of their soldiers and an enhanced ability to perform mission-related tasks.

MFTs can help commanders formulate sound programs that will attain their physical training goals, but commanders must know and apply the doctrine. However, since the responsibility for physical training is the commander's, programs must be based on his own training objectives. These he must develop from his evaluation of the unit's mission-essential task list (METL). Chapter 10 describes the development of the unit's program.

## MASTER FITNESS TRAINERS

A Master Fitness Trainer (MFT) is a soldier who has completed either the four-week active-component, two-week reserve-component, or U.S. Military Academy's MFT course work. Although called "masters," MFTs are simply soldiers who know about all aspects of physical fitness training and how soldiers' bodies function. Most importantly, since MFTs are taught to design individual and unit programs, they should be used by commanders as special staff assistants for this purpose.

MFTs can do the following:

- Assess the physical fitness levels of individuals and units.
- Analyze the unit's mission-related tasks and develop sound fitness training programs to support those tasks.
- Train other trainers to conduct sound, safe physical training.
- Understand the structure and function of the human body, especially as it relates to exercise.

**Components of Fitness**

Physical fitness is the ability to function effectively in physical work, training, and other activities and still have enough energy left over to handle any emergencies which may arise.

The components of physical fitness are as follows:

- Cardiorespiratory (CR) endurance - the efficiency with which the body delivers oxygen and nutrients needed for muscular activity and transports waste products from the cells.
- Muscular strength - the greatest amount of force a muscle or muscle group can exert in a single effort.
- Muscular endurance - the ability of a muscle or muscle group to perform repeated movements with a submaximal force for extended periods of time.
- Flexibility - the ability to move the joints (for example, elbow, knee or any group of joints through an entire, normal range of motion.)
- Body composition- the amount of body fat a soldier has in comparison to his total body mass.

Improving the first three components of fitness listed above will have a positive impact on body composition and will result in less fat. Excessive body fat detracts from the other fitness components, reduces performance, detracts from appearance, and negatively affects one's health.

Factors such as speed, agility, muscle power, eye-hand coordination, and eye-foot coordination are classified as components of "motor" fitness. These factors affect a soldier's survivability on the battlefield. Appropriate training can improve these factors within the limits of each soldier's potential. The Army's fitness program seeks to improve or maintain all the components of physical and motor fitness through sound, progressive, mission-specific physical training for individuals and units.

**Principles of Exercise**

Adherence to certain basic exercise principles is important for developing an effective program. The principles of exercise apply to everyone at all levels of physical training, from the Olympic-caliber athlete to the weekend jogger. They also apply to fitness training for military personnel.

These basic principles of exercise must be followed:

- Regularity. To achieve a training effect, a person must exercise of ten. One should strive to exercise each of the first four fitness components at least three times a week. Infrequent exercise can do more harm than good. Regularity is also important in resting, sleeping, and following a good diet.
- Progression. The intensity (how hard) and/or duration (how long) of exercise must gradually increase to improve the level of fitness.
- Balance. To be effective, a program should include activities that address all the fitness components, since over-emphasizing any one of them may hurt the others.
- Variety. Providing a variety of activities reduces boredom and increases motivation and progress.
- Specificity. Training must be geared become better runners if their training emphasizes running. Although swimming is a great exercise, it does not improve a 2-mile-run time as much as a running program does.
- Recovery. A hard day of training for a given component of fitness should be followed by an easier training day or rest day for that component and/or muscle group(s) to help permit recovery. Another way to allow recovery is to alternate the muscle groups exercised every session must exceed the normal demands placed on the body in order to bring about a training effect.
- Overload. The workload of each exercise session must exceed the normal demands

placed on the body in order to bring about a training effect.

### FITT Factors

Certain factors must be part of any fitness training program for it to be successful. These factors are Frequency, Intensity, Time, and Type. The acronym FITT makes it easier to remember them. (See Figure 1-1.)

### FREQUENCY

Army Regulation 350-15 specifies that vigorous physical fitness training will be conducted 3 to 5 times per week. For optimal results, commanders must strive to conduct 5 days of physical training per week. Ideally, at least three exercise sessions for CR fitness, muscle endurance, muscle strength, and flexibility should be performed each week to improve fitness levels. Thus, for example, to obtain maximum gains in muscular strength, soldiers should have at least three strength-training sessions per week. Three physical activity periods a week, however, with only one session each of cardiorespiratory, strength, and flexibility training will not improve any of these three components.

With some planning, a training program for the average soldier can be developed which provides fairly equal emphasis on all the components of physical fitness. The following training program serves as an example.

In the first week, Monday, Wednesday, and Friday are devoted to CR fitness, and Tuesday and Thursday are devoted to muscle endurance and strength. During the second week, the training days are flip-flopped: muscle endurance and strength are trained on Monday, Wednesday, and Friday, and CR fitness is trained on Tuesday and Thursday. Stretching exercises are done in every training session to enhance flexibility. By training continuously in this manner, equal emphasis can be given to developing muscular endurance and strength and to CR fitness while training five days per week.

If the unit's mission requires it, some muscular and some CR training can be done during each daily training session as long as a "hard day/recovery day" approach is used. For example, if a unit has a hard run on Monday, Wednesday, and Friday, it may also choose to run on Tuesday and Thursday. However, on Tuesday and Thursday the intensity and/or distance/time should be reduced to allow recovery. Depending on the time available for each session and the way training sessions are conducted, all components of fitness can be developed using a three-day-per-week schedule. However, a five-day-per-week program is much better than three per week. (See Training Program in Chapter 10.)

Numerous other approaches can be taken when tailoring a fitness program to meet a unit's mission as long as the principles of exercise are not violated. Such programs, when coupled with good nutrition, will help keep soldiers fit to win.

### INTENSITY

Training at the right intensity is the biggest problem in unit programs. The intensity should vary with the type of exercise being done. Exercise for CR development must be strenuous enough to elevate the heart rate to between 60 and 90 percent of the heart rate reserve (HRR). (The calculation of percent HRR is explained in Chapter 2.) Those with low fitness levels should start exercising at a lower training heart rate (THR) of about 60 percent of HRR.

For muscular strength and endurance, intensity refers to the percentage of the maximum resistance that is used for a given exercise. When determining intensity in a strength-training program, it is easier to refer to a "repetition maximum" or "RM." For example, a 10-RM is the maximum weight that can be correctly lifted 10 times. An 8-12 RM is the weight that can be lifted 8 to 12 times correctly. Doing an exercise "correctly" means moving the weight steadily and with proper form without getting help from other muscle groups by jerking, bending, or twisting the body. For the average person who wants to improve both muscular strength and endurance, an 8-12 RM is best.

The person who wants to concentrate on muscular strength should use weights which let him do three to seven repetitions before his muscles fatigue. Thus, for strength development, the weight used should be a 3-7 RM. On the other hand, the person who wants to concentrate on muscular endurance should use a 12+ RM. When using a 12+ RM as the training intensity, the more repetitions performed per set,

over time, the greater will be the improvement in muscular endurance.

**FITT Factors Applied to Physical Conditioning Program**

| Cardiorespiratory Endurance | Muscular Strength | Muscular Endurance | Muscular Strength and Muscular Endurance | Flexibility |
|---|---|---|---|---|
| **Frequency**<br>3-5 times/week | 3 times/week | 3 times/week | 3 times/week | Warm-up and Cool down:<br>stretch before and after each exercise session<br><br>Developmental Stretching<br>To improve flexibility, stretch 2-3 time/week |
| **Intensity**<br>60-90% HRR* | 3-7 RM* | 12+ RM | 8-12 RM | Tension and slight discomfort, NOT PAIN |
| **Time**<br>20 minutes or more | The time required to do 3-7 repetitions of each exercise | The time required to do 12+ repetitions of each exercise | The time required to do 8-12 repetitions of each exercise | Warm-up and Cool-down Stretches:<br>10-15 seconds/stretch<br><br>Developmental Stretches:<br>30-60 seconds/stretch |
| **Type**<br>Running<br>Swimming<br>Cross Country Skiing<br>Rowing<br>Bicycling<br>Jumping Rope<br>Walking/Hiking<br>Stair Climbing | Free Weights<br>Resistance Machine<br>Partner-Resisted Exercises<br>Body-Weight Exercises (Pushups/Situps/Pullups/Dips, Etc.) | | | Stretching:<br><br>Static<br>Passive<br>P.N.F. |

* HRR = Heart Rate Reserve  * RM = Repetition Maximum

Figure 1-1

Conversely, the greater the number of repetitions performed, the smaller will be the gains in strength. For example, a person who regularly trains with a weight which lets him do 100 repetitions per exercise (a 100-RM) greatly increases his muscular endurance but minimally improves his muscular strength. (See Chapter 3 for information on resistance training.)

All exercise sessions should include stretching during the warm-up and cool-down. One should stretch so there is slight discomfort, but no pain, when the movement is taken beyond the normal range of motion. (See Chapter 4 for information on stretching.)

## TIME

Like intensity, the time spent exercising depends on the type of exercise being done. At least 20 to 30 continuous minutes of intense exercise must be used in order to improve cardiorespiratory endurance.

For muscular endurance and strength, exercise time equates to the number of repetitions done. For the average soldier, 8 to 12 repetitions with enough resistance to cause muscle failure improves both muscular endurance and strength. As soldiers progress, they will make better strength gains by doing two or three sets of each resistance exercise.

Flexibility exercises or stretches should be held for varying times depending on the objective of the session. For warming-up, such as before a run, each stretch should be held for 10 to 15 seconds. To improve flexibility, it is best to do stretching during the cool-down, with each stretch held for 30 to 60 seconds. If flexibility improvement is a major goal, at least one session per week should be devoted to developing it.

## TYPE

Type refers to the kind of exercise performed. When choosing the type, the commander should consider the principle of specificity. For example, to improve his soldiers' levels of CR fitness (the major fitness component in the 2-mile run), he should have them do CR types of exercises. These are discussed in Chapter 2.

Ways to train for muscular strength and endurance are addressed in Chapter 3, while Chapter 4 discusses flexibility. These chapters will help commanders design programs which are tailor-made to their soldiers' needs. The basic rule is that to improve performance, one must practice the particular exercise, activity, or skill he wants to improve. For example, to be good at push-ups, one must do push-ups. No other exercise will improve push-up performance as effectively.

## Warm-up and Cool-Down

One must prepare the body before taking part in organized PT, unit sports competition, or vigorous physical activity. A warm-up may help prevent injuries and maximize performance. The warm-up increases the body's internal temperature and the heart rate. The chance of getting injured decreases when the heart, muscles, ligaments, and tendons are properly prepared for exertion. A warm-up should include some running-in-place or slow jogging, stretching, and calisthenics. It should last five to seven minutes and should occur just before the CR or muscular endurance and strength part of the workout. After a proper warm-up, soldiers are ready for a more intense conditioning activity.

Soldiers should cool down properly after each exercise period, regardless of the type of workout. The cool-down serves to gradually slow the heart rate and helps prevent pooling of the blood in the legs and feet. During exercise, the muscles squeeze the blood through the veins. This helps return the blood to the heart. After exercise, however, the muscles relax and no longer do this, and the blood can accumulate in the legs and feet. This can cause a person to faint. A good cool-down will help avoid this possibility.

Soldiers should walk and stretch until their heart rates return to less than 100 beats per minute (BPM) and heavy sweating stops. This usually happens five to seven minutes after the conditioning session.

## Phases of Fitness Conditioning

The physical fitness training program is divided into three phases: preparatory, conditioning, and maintenance. The starting phases for different units or individuals vary depending on their age, fitness levels, and previous physical activity.

Young, healthy persons may be able to start with the conditioning phase, while those who have been exercising regularly may already be in the maintenance phase. Factors such as extended field training, leave time, and illness can cause soldiers to drop from a maintenance to a conditioning phase. Persons who have not been active, especially if they are age 40 or older, should start with the preparatory phase. Many soldiers who fall into this category may be recovering from illness or injury, or they may be just out of high school. Most units will have soldiers in all three phases of training at the same time.

## PREPARATORY PHASE

The preparatory phase helps both the cardiorespiratory and muscular systems get used to exercise, preparing the body to handle the conditioning phase. The work load in the beginning must be moderate. Progression from a lower to a higher level of fitness should be achieved by gradual, planned increases in frequency, intensity, and time.

Initially, poorly conditioned soldiers should run, or walk if need be, three times a week at a comfortable pace that elevates their heart rate to about 60 percent HRR for 10 to 15 minutes. Recovery days should be evenly distributed throughout the week, and training should progress slowly. Soldiers should continue at this or an appropriate level until they have no undue fatigue or muscle soreness the day following the exercise. They should then lengthen their exercise session to 16 to 20 minutes and/or elevate their heart rate to about 70 percent HRR by increasing their pace. To be sure their pace is faster, they should run a known distance and try to cover it in less time. Those who feel breathless or whose heart rate rises beyond their training heart rate (THR) while running should resume walking until the heart rate returns to the correct training level. When they can handle an intensity of 70 percent HRR for 20 to 25 minutes, they should be ready for the next phase. Chapter 2 shows how to determine the THR, that is, the right training level during aerobic training.

The preparatory phase for improving muscular endurance and strength through weight training should start easily and progress gradually. Beginning weight trainers should select about 8 to 12 exercises that ork all the body's major muscle groups. They should use only very light weights the first week (that is, the first two to three workouts). This is very important, as they must first learn the proper form for each exercise. Light weights will also help minimize muscle soreness and decrease the likelihood of injury to the muscles, joints, and ligaments. During the second week, they should use progressively heavier weights on each resistance exercise. By the end of the second week (four to six workouts), they should know how much weight will let them do 8 to 12 repetitions to muscle failure for each exercise. At this point the conditioning phase begins.

## CONDITIONING PHASE

To reach the desired level of fitness, soldiers must increase the amount of exercise and/or the workout intensity as their strength and/or endurance increases.

To improve cardiorespiratory endurance, for example, they must increase the length of time they run. They should start with the preparatory phase and gradually increase the running time by one or two minutes each week until they can run continuously for 20 to 30 minutes. At this point, they can increase the intensity until they reach the desired level of fitness. They should train at least three times a week and take no more than two days between workouts.

For weight trainers, the conditioning phase normally begins during the third week. They should do one set of 8 to 12 repetitions for each of the selected resistance exercises. When they can do more than 12 repetitions of any exercise, they should increase the weight used on that exercise by about five percent so they can again do only 8 to 12 repetitions. This process continues throughout the conditioning phase. As long as they continue to progress and get stronger while doing only one set of each exercise, it is not necessary for them to do more than one set per exercise. When they stop making progress with one set, they should add another set on those exercises in which progress has slowed. As training progresses, they may want to increase the sets to three to help promote further increases in strength and/ or muscle mass.

Soldiers and units should be encouraged to progress beyond minimum requirements.

For maximum benefit, soldiers should do strength training three times a week with 48 hours of rest between workouts for any given muscle group. It helps to periodically do a different type of exercise for a given muscle or muscle group. This adds variety and ensures better strength development.

The conditioning phase ends when a soldier is physically mission-capable and all personal, strength-related goals and unit-fitness goals have been met.

## MAINTENANCE PHASE

The maintenance phase sustains the high level of fitness achieved in the conditioning phase. The emphasis here is no longer on progression. A well-designed, 45- to 60-minute workout (including warm-up and cool-down) at the right intensity three times a week is enough to maintain almost any appropriate level of physical fitness. These workouts give soldiers time to stabilize their flexibility, CR endurance, and muscular endurance and strength. However, more frequent training may be needed to reach and maintain peak fitness levels.

Soldiers and units should always be encouraged to progress beyond minimum requirements. Maintaining an optimal level of fitness should become part of every soldier's life-style and should be continued throughout his life.

An effective program uses a variety of activities to develop muscular endurance and strength, CR endurance, and flexibility, and to achieve good body composition. It should also promote the development of coordination as well as basic physical skills. (See Chapter 10 for guidance in constructing a unit program.)

### Types of Fitness Programs

The Army has too many types of units with different missions to have one single fitness program for everyone. Therefore, only broad categories of programs and general considerations are covered here. They are classified as unit, individual, and special programs.

## UNIT PROGRAMS

Unit programs must support unit missions. A single unit may require several types of programs. Some units, such as infantry companies, have generally the same types of soldiers and MOSS. On the other hand, certain combat-service-support units have many different types of soldiers, each with unique needs. Commanders can develop programs for their own unit by following the principles in this chapter. MFTs know how to help commanders develop programs for their units/soldiers.

Commanders of units composed of both men and women must also understand the physiological differences between the sexes. These are summarized in Appendix A. Although women are able to participate in the same fitness programs as men, they must work harder to perform at the same absolute level of work or exercise. The same holds true for poorly-conditioned soldiers running with well conditioned soldiers.

To overcome this problem in the case of running, for example, the unit should use ability group runs rather than unit runs. Soldiers in a given ability group will run at a set pace, with groups based on each soldier's most recent 2-mile-run time. Three to six groups per company-sized unit are usually enough. Within each group, each soldier's heart rate while running should be at his own THR. When the run is not intense enough to bring one or more of the soldiers to THR, it is time for those soldiers to move up to the next ability group.

Ability group running does two things more effectively than unit runs:
1) it lets soldiers improve to their highest attainable fitness level; and, 2) it more quickly brings subpar performers up to minimum standards.

It also allows soldiers to train to excel on the APFT which, in turn, helps promotion opportunities. Holding a fit soldier back by making him run at a slow, unit-run pace (normally less than his minimum pace for the 2 mile run on the APFT) hurts his morale and violates the principle of training to challenge.

### Initial Entry Training (IET)

The training program in basic training (BT) brings soldiers up to the level of physical fitness they need to do their jobs as soldiers. However, the program requires good cadre leadership to ensure that it is appropriate, demanding, and challenging.

Trainees report to active duty at various levels of physical fitness and ability. During basic training they pass through the preparatory into the conditioning phase. During "fill" periods and the first week of training, the focus is on learning and developing the basics of physical fitness.

Training emphasizes progressive conditioning of the whole body. To minimize

the risk of injury, exercises must be done properly, and the intensity must progress at an appropriate rate. Special training should be considered for soldiers who fail to maintain the unit's or group's rate of progression. Commanders should evaluate each basic trainee who falls below standard and give him individualized, special assistance to improve his deficiencies.

Additional training should not be used as punishment for a soldier's inability to perform well.

More PT is not necessarily better. Chapter 11 describes how to develop physical training programs in IET units.

### Advanced Individual Training (AIT)

Although AIT focuses on technical and MOS-oriented subjects, physical fitness must be emphasized throughout. Most soldiers arriving from basic training are already well into the conditioning phase. Therefore, AIT unit training should focus on preparing soldiers to meet the physical requirements of their initial duty assignments. (See TRADOC Reg. 350-6, Chapter 4.)

Walking, running, and climbing during unit training contribute to physical fitness, but they are not enough. Physical training in AIT requires continued, regular, vigorous exercise which stresses the whole body and addresses all the components of fitness.

By the end of AIT, soldiers must meet APFT standards. With good programs and special training, all healthy AIT graduates should easily be able to demonstrate that they, possess the required level of physical fitness.

### TOE and TDA Units--Active Component

There are many types of units in the Army, and their missions often require different levels of fitness. TOE and TDA units must emphasize attaining and maintaining the fitness level required for the mission.

The unit's standards may exceed the Army's minimums. By regulation (AR 350-15), the unit's standards can be established by the unit's commander, based on mission requirements.

### TOE and TDA Units--Reserve Components

The considerations for the active component also apply to reserve components (RCS). However, since members of RC units cannot participate together in collective physical training on a regular basis, RC unit programs must focus on the individual's fitness responsibilities and efforts. Commanders, however, must still ensure that the unit's fitness level and individual PT programs are maintained. MFTs can give valuable assistance to RC commanders and soldiers.

## INDIVIDUAL PROGRAMS

Many soldiers are assigned to duty positions that offer little opportunity to participate in collective unit PT programs. Examples are HQDA, MACOM staffs, hospitals, service school staff and faculty, recruiting, and ROTC. In such organizations, commanders must develop leadership environments that encourage and motivate soldiers to accept individual responsibility for their own physical fitness. Fitness requirements are the same for these personnel as for others. Section chiefs and individual soldiers need to use the fundamental principles and techniques outlined in this manual to help them attain and maintain a high level of physical fitness. MFTs can help develop individual fitness programs.

## SPECIAL PROGRAMS

The day-to-day unit PT program conducted for most soldiers may not be appropriate for all unit members. Some of them may not be able to exercise at the intensity or duration best suited to their needs.

At least three groups of soldiers may need special PT programs. They are as follows:

- Those who fail the APFT and do not have medical profiles.
- Those who are overweight/overfat according to AR 600-9
- Those who have either permanent or temporary medical profiles.

Leaders must also give special consideration to soldiers who are age 40 or older

and to recent arrivals who cannot meet the standards of their new unit.

Special programs must be tailored to each soldier's needs, and trained, knowledgeable leaders should develop and conduct them. This training should be conducted with the unit. If this is impossible, it should at least occur at the same time.

There must be a positive approach to all special fitness training. Soldiers who lack enough upper body strength to do a given number of push-ups or enough stamina to pass the 2-mile run should not be ridiculed. Instead, their shortcomings should be assessed and the information used to develop individualized programs to help them remedy their specific shortcomings. A company-sized unit may have as many as 20 soldiers who need special attention. Only smart planning will produce good programs for all of them.

Commanders must counsel soldiers, explaining that special programs are being developed in their best interests. They must make it clear that standards will be enforced. Next, they should coordinate closely with medical personnel to develop programs that fit the capabilities of soldiers with medical limitations. Each soldier should then begin an individualized program based on his needs.

MFTs know how to assess CR endurance, muscular strength and endurance, flexibility, and body composition. They can also develop thorough, tailor-made programs for all of a unit's special population.

## APFT Failures

Although it is not the heart of the Army's physical fitness program, the APFT is the primary instrument for evaluating the fitness level of each soldier. It is structured to assess the muscular endurance of specific muscle groups and the functional capacity of the CR system.

Soldiers with reasonable levels of overall physical fitness should easily pass the APFT. Those whose fitness levels are substandard will fail. Soldiers who fail the APFT must receive special attention. Leaders should analyze their weaknesses and design programs to overcome them. For example, if the soldier is overweight, nutrition and dietary counseling may be needed along with a special exercise program. DA Pam 350-22 outlines several ways to improve a soldier's performance on each of the APFT events.

When trying to improve APFT performances, leaders must ensure that soldiers are not overloaded to the point where the fitness training becomes counterproductive. They should use ability groups for their running program and, in addition to a total-body strength-training program, should include exercises designed for push-up and sit-up improvement. When dealing with special populations, two very important principles are overload and recovery. The quality, not just the quantity, of the workout should be emphasized. Two-a-day sessions, unless designed extremely well, can be counter-productive. More PT is not always better.

## Overweight Soldiers

Designers of weight loss and physical training programs for overweight soldiers should remember this: even though exercise is the key to sensible weight loss, reducing the number of calories consumed is equally important. A combination of both actions is best.

The type of exercise the soldier does affects the amount and nature of the weight loss. Both running and walking burn about 100 calories per mile. One pound of fat contains 3,500 calories. Thus, burning one pound of fat through exercise alone requires a great deal of running or walking. On the other hand, weight lost through dieting alone includes the loss of useful muscle tissue. Those who participate in an exercise program that emphasizes the development of strength and muscular endurance, however, can actually increase their muscle mass while losing body fat. These facts help explain why exercise and good dietary practices must be combined.

Unit MFTs can help a soldier determine the specific caloric requirement he needs to safely and successfully lose excess fat. They can devise a sound, individualized plan to arrive at that reduced caloric intake. Likewise, unit MFTs can also develop training programs which will lead to fat loss without the loss of useful muscle tissue.

Generally, overweight soldiers should strive to reduce their fat weight by two pounds per week. When a soldier loses weight, either by

diet or exercise or both, a large initial weight loss is not unusual. This may be due to water loss associated with the using up of the body's carbohydrate stores. Although these losses may be encouraging to the soldier, little of this initial weight loss is due to the loss of fat.

Soldiers should be weighed under similar circumstances and at the same time each day. This helps avoid false measurements due to normal fluctuations in their body weight during the day. As a soldier develops muscular endurance and strength, lean muscle mass generally increases. Because muscle weighs more per unit of volume than fat. caution is advised in assessing his progress. Just because a soldier is not losing weight rapidly does not necessarily mean he is not losing fat. In fact, a good fitness program often results in gaining muscle mass while simultaneously losing fat weight. If there reasonable doubt, his percentage body fat should be determined.

### Soldiers with Profiles

This manual stresses what soldiers can do while on medical profile rather than what they cannot do.

DOD Directive 1308.1 requires that, "Those personnel identified with medically limiting defects shall be placed in a physical fitness program consistent with their limitations as advised by medical authorities."

AR 350-15 states, "For individuals with limiting profiles, commanders will develop physical fitness programs in cooperation with health care personnel."

The Office of the Surgeon General has developed DA Form 3349 to ease the exchange of information between health care personnel and the units. On this form, health care personnel list, along with limitations, those activities that the profiled soldier can do to maintain his fitness level. With this information, the unit should direct profiled soldiers to participate in the activities they an do. (An example of DA Form 3349 is in Appendix B.)

All profiled soldiers should take part in as much of the regular fitness program as they can. Appropriate activities should be substituted to replace those regular activities in which they cannot participate.

Chapter 2 describes some aerobic activities the soldier can do to maintain cardiorespiratory fitness when he cannot run. Chapter 3 shows how to strengthen each body part. Applying this information should allow some strength training to continue even when body parts are injured. The same principle applies to flexibility (Chapter 4).

Medical treatment and rehabilitation should be aimed at restoring the soldier to a suitable level of physical fitness. Such treatment should use appropriate, progressive physical activities with medical or unit supervision.

MFTs can help profiled soldiers by explaining alternative exercises and how to do them safely under the limitations of their profile. MFTs are not, however, trained to diagnose injuries or prescribe rehabilitative exercise programs. This is the domain of qualified medical personnel.

The activity levels of soldiers usually decrease while they are recovering from sickness or injury. As a result, they should pay special attention to their diets to avoid gaining body fat. This guidance becomes more important as soldiers grow older. With medical supervision, proper diet, and the right PT programs, soldiers should be able to overcome their physical profiles and quickly return to their normal routines and fitness levels.

### Age as a Factor in Physical Fitness

Soldiers who are age 40 and older represent the Army's senior leadership. On the battlefield, they must lead other soldiers under conditions of severe stress. To meet this challenge and set a good example, these leaders must maintain and demonstrate a high level of physical fitness. Since their normal duties may be stressful but nonphysical, they must take part regularly in a physical fitness program. The need to be physically fit does not decrease with increased age.

People undergo many changes as they grow older. For example, the amount of blood the heart can pump per beat and per minute decreases during maximal exercise, as does the maximum heart rate. This lowers a person's physical ability, and performance suffers. Also, the percent of body weight composed of fat generally increases, while total muscle mass decreases. The result is that muscular strength and endurance, CR endurance, and body

composition suffer. A decrease in flexibility also occurs.

Men tend to maintain their peak levels of muscular strength and endurance and CR fitness until age 30. After 30 there is a gradual decline throughout their lives. Women tend to reach their peak in physical capability shortly after puberty and then undergo a progressive decline.

Although a decline in performance normally occurs with aging, those who stay physically active do not have the same rate of decline as those who do not. Decreases in muscular strength and endurance, CR endurance, and flexibility occur to a lesser extent in those who regularly train these fitness components.

Soldiers who are fit at age 40 and continue to exercise show a lesser decrease in many of the physiological functions related to fitness than do those who seldom exercise. A trained 60-year-old, for example, may have the same level of CR fitness as a sedentary 20-year-old. In short, regular exercise can help add life to your years and years to your life.

The assessment phase of a program is especially important for those age 40 and over. However, it is not necessary or desirable to develop special fitness programs for these soldiers. Those who have been exercising regularly may continue to exercise at the same level as they did before reaching age 40. A program based on the principles of exercise and the training concepts in this manual will result in a safe, long-term conditioning program for all soldiers. Only those age 40 and over who have not been exercising regularly may need to start their exercise program at a lower level and progress more slowly than younger soldiers. Years of inactivity and possible abuse of the body cannot be corrected in a few weeks or months.

As of 1 January 1989, soldiers reaching age 40 are no longer required to get clearance from a cardiovascular screening program before taking the APFT. Only a medical profile will exempt them from taking the biannual record APFT. They must, however, have periodic physical examinations in accordance with AR 40-501 and NGR 40-501. These include screening for cardiovascular risk factors.

### Evaluation

To evaluate their physical fitness and the effectiveness of their physical fitness training programs, all military personnel are tested biannually using the APFT in accordance with AR 350-15. (Refer to Chapter 14.) However, commanders may evaluate their physical fitness programs more frequently than biannually.

## SCORING CATEGORIES

There are two APFT categories of testing for all military personnel Initial Entry Training (IET) and the Army Standard.

### IET Standard

The APFT standard for basic training is a minimum of 50 points per event and no less than 150 points overall by the end of basic training. Graduation requirements for AIT and One Station Unit Training (OSUT) require 60 points per event.

### Army Standard

All other Army personnel (active and reserve) who are non-IET soldiers must attain the minimum Army standard of at least 60 points per event. To get credit for a record APFT, a medically profiled soldier must, as a minimum, complete the 2-mile run or one of the alternate aerobic events.

## SAFETY

Safety is a major consideration when planning and evaluating physical training programs. Commanders must ensure that the programs do not place their soldiers at undue risk of injury or accident. They should address the following items:

- Environmental conditions (heat/cold /traction).
- Soldiers' levels of conditioning (low/high/age and sex).
- Facilities (availability /instruction /repair).
- Traffic (routes/procedures/formations).
- Emergency procedures (medical/ communication/transport).

The objective of physical training in the Army is to enhance soldiers' abilities to meet the

physical demands of war. Any physical training which results in numerous injuries or accidents is detrimental to this goal. As in most training, common sense must prevail. Good, sound physical training should challenge soldiers but should not place them at undue risk nor lead to situations where accidents or injuries are likely to occur.

**CHAPTER 2**

**Cardiorespiratory Fitness**

Cardiorespiratory (CR) fitness, sometimes called CR endurance, aerobic fitness, or aerobic capacity, is one of the five basic components of physical fitness. CR fitness is a condition in which the body's cardiovascular (circulatory) and respiratory systems function together, especially during exercise or work, to ensure that adequate oxygen is supplied to the working muscles to produce energy. CR fitness is needed for prolonged, rhythmic use of the body's large muscle groups. A high level of CR fitness permits continuous physical activity without a decline in performance and allows for rapid recovery following fatiguing physical activity.

Activities such as running, road marching, bicycling, swimming, cross-country skiing, rowing, stair climbing, and jumping rope place an extra demand on the cardiovascular and respiratory systems. During exercise, these systems attempt to supply oxygen to the working muscles. Most of this oxygen is used to produce energy for muscular contraction. Any activity that continuously uses large muscle groups for 20 minutes or longer taxes these systems. Because of this, a wide variety of training methods is used to improve cardio-respiratory endurance.

## Physiology of Aerobic Training

Aerobic exercise uses oxygen to produce most of the body's energy needs. It also brings into play a fairly complex set of physiological events.

- To provide enough energy- producing oxygen to the muscles, the following events occur:
- Greater movement of air through the lungs.
- Increased movement of oxygen from the lungs into the blood stream.
- Increased delivery of oxygen - laden blood to the working muscles by the heart's accelerated pumping action.
- Regulation of the blood vessel's size to distribute blood away from inactive tissue to working muscle.
- Greater movement of oxygen from the blood into the muscle tissue.
- Accelerated return of veinous blood to the heart.

Correctly performed aerobic exercise, overtime, causes positive changes in the body's CR system. These changes allow the heart and vascular systems to deliver more oxygen-rich blood to the working muscles during exercise. Also, those muscles regularly used during aerobic exercise undergo positive changes. By using more oxygen, these changes let the muscles make and use more energy during exercise and, as a result, the muscles can work longer and harder.

During maximum aerobic exercise, the trained person has an increased maximum oxygen consumption ($VO_2$max). He is better able to process oxygen and fuel and can therefore provide more energy to the working muscles.

$VO_2$max, also called aerobic capacity, is the most widely accepted single indicator of one's CR fitness level.

The best way to determine aerobic capacity is to measure it in the laboratory. It is much easier, however, to estimate maximum oxygen uptake by using other methods.

It is possible to determine a soldier's CR fitness level and get an accurate estimate of his aerobic capacity by using his APFT 2-mile-run time. (Appendix F explains how to do this.)Other tests - the bicycle, walk, and step tests - may also be used to estimate one's aerobic capacity and evaluate one's CR fitness level.

In the presence of oxygen, muscle cells produce energy by breaking down carbohydrates and fats. In fact, fats are only used as an energy source when oxygen is present. Hence, aerobic exercise is the best type of activity for attaining and maintaining a low percentage of body fat.

A person's maximum aerobic capacity can be modified through physical training. To reach very high levels of aerobic fitness, one must train hard. The best way to improve CR

fitness is to participate regularly in a demanding aerobic exercise program.

Many factors can negatively affect one's ability to perform well aerobically. These include the following:

- Age.
- Anemia.
- Carbon monoxide from tobacco smoke or pollution.
- High altitude (reduced oxygen pressure).
- Illness (heart disease).
- Obesity.
- Sedentary life-style.

Any condition that reduces the body's ability to bring in, transport, or use oxygen reduces a person's ability to perform aerobically. Inactivity causes much of the decrease in physical fitness that occurs with increasing age. Some of this decrease in aerobic fitness can be slowed by taking part in a regular exercise program.

Certain medical conditions also impair the transport of oxygen. They include diseases of the lungs, which interfere with breathing, and disabling heart conditions. Another is severe blocking of the arteries which inhibits blood flow to the heart and skeletal muscles.

Smoking can lead to any or all of the above problems and can, in the long and short term, adversely affect one's ability to do aerobic exercise.

## FITT Factors

As mentioned in Chapter 1, a person must integrate several factors into any successful fitness training program to improve his fitness level. These factors are summarized by the following words which form the acronym FITT. Frequency, Intensity, Time, and Type. They are described below as they pertain to cardiorespiratory fitness. A warm-up and cool-down should also be part of each workout. Information on warming up and cooling down is given in Chapters 1 and 4.

## FREQUENCY

Frequency refers to how often one exercises. It is related to the intensity and duration of the exercise session. Conditioning the CR system can best be accomplished by three adequately intense workouts per week. Soldiers should do these on alternate days. By building upgradually, soldiers can get even greater benefits from working out five times a week. However, leaders should recognize the need for recovery between hard exercise periods and should adjust the training intensity accordingly. They must also be aware of the danger of overtraining and recognize that the risk of injury increases as the intensity and duration of training increases.

## INTENSITY

Intensity is related to how hard one exercises. It represents the degree of effort with which one trains and is probably the single most important factor for improving performance. Unfortunately, it is the factor many units ignore.

Changes in CR fitness are directly related to how hard an aerobic exercise is performed. The more energy expended per unit of time, the greater the intensity of the exercise. Significant changes in CR fitness are brought about by sustaining training heart rates in the range of 60 to 90 percent of the heart rate reserve (HRR). Intensities of less than 60 percent HRR are generally inadequate to produce a training effect, and those that exceed 90 percent HRR can be dangerous.

Soldiers should gauge the intensity of their workouts for CR fitness by determining and exercising at their training heart rate (THR). Using the THR method lets them find and prescribe the correct level of intensity during CR exercise. By determining one's maximum heart rate, resting heart rate, and relative conditioning level, an appropriate THR or intensity can be prescribed.

One's ability to monitor the heart rate is the key to success in CR training. (Note: Ability-group running is better than unit running because unit running does not accommodate the individual soldier's THR. For example, some soldiers in a formation may be training at 50 percent HRR and others at 95 percent HRR. As a result, the unit run will be too intense for some and not intense enough for others.)

The heart rate during work or exercise is an excellent indicator of how much effort a person is exerting. Keeping track of the heart rate lets one gauge the intensity of the CR exercise being done. With this information, one can be sure that the intensity is enough to improve his CR fitness level.

Following are two methods for determining training heart rate (THR). The first method, percent maximum heart rate (% MHR), is simpler to use, while the second method, percent heart rate reserve (%HRR), is more accurate. Percent HRR is the recommended technique for determining THR.

Intensity is probably the single most important factor for improving performance.

**Percent MHR Method**

With this method, the THR is figured using the estimated maximal heart rate. A soldier determines his estimated maximum heart rate by subtracting his age from 220. Thus, a 20-year-old would have an estimated maximum heart rate (MHR) of 200 beats per minute (220 - 20 = 200).

By determining one's maximum heart rate, resting rate, and conditioning level, an appropriate THR can be prescribed.

To figure a THR that is 80 percent of the estimated MHR for a 20-year-old soldier in good physical condition, multiply 0.80 times the MHR of 200 beats per minute (BPM). This example is shown below.

**FORMULA**

**% x MHR = THR**

**CALCULATION**

**0.80 x 200 BPM = 160 BPM**

When using the MHR method, one must compensate for its built-in weakness. A person using this method may exercise at an intensity which is not high enough to cause a training effect. To compensate for this, a person who is in poor shape should exercise at 70 percent of his MHR; if he is in relatively good shape, at 80 percent MHR; and, if he is in excellent shape, at 90 percent MHR.

**Percent HRR Method**

A more accurate way to calculate THR is the percent HRR method. The range from 60 to 90 percent HRR is the THR range in which people should exercise to improve their CR fitness levels. If a soldier knows his general level of CR fitness, he can determine which percentage of HRR is a good starting point for him. For example, if he is in excellent physical condition, he could start at 85 percent of his HRR; if he is in reasonably good shape, at 70 percent HRR; and, if he is in poor shape, at 60 percent HRR.

Most CR workouts should be conducted with the heart rate between 70 to 75 percent HRR to attain, or maintain, an adequate level of fitness. Soldiers who have reached a high level of fitness may derive more benefit from working at a higher percentage of HRR, particularly if they cannot find more than 20 minutes for CR exercise. Exercising at any lower percentage of HRR does not give the heart, muscles, and lungs an adequate training stimulus.

Before anyone begins aerobic training, he should know his THR (the heart rate at which he needs to exercise to get a training effect).

The example below shows how to figure the THR by using the resting heart rate reserve (HRR). A 20-year-old male soldier in reasonably good physical shape is the example.

Step 1: Determine the MHR by subtracting the soldier's age from 220.

**FORMULA**
**220 - age = MHR**
**(GIVEN)**

**220 - 20 = 200 BPM**

STEP 2: Determine the RHR in beats per minute (BPM) by counting the resting pulse for 30 seconds, and multiply the count by two. A shorter period can be used, but a 30-second count is more accurate. This count should be taken while the soldier is completely relaxed and rested. How to determine heart rate reserve (HRR) by subtracting the RHR from

the estimated MHR. If the soldier's RHR IS 69 BPM, the HRR is calculated as shown here.

**FORMULA**
**MHR - RHR = HRR**

**CALCULATION**
**200 BPM - 69 BPM = 131 BPM**

STEP 3: Calculate the THR based on 70 percent of HRR (a percentage based on a good level of CR fitness).

**FORMULA**
**(% x HRR) + RHR = THR**

**CALCULATION**
**(0.70X131 BPM)+69 BPM=160.7 BPM**

As shown, the percentage (70 percent in this example) is converted to the decimal form (0.70) before it is multiplied by the HRR. The result is then added to the resting heart rate (RHR) to get the THR. Thus, the product obtained by multiplying 0.70 and 131 is 91.7. When 91.7 is added to the RHR of 69, a THR of 160.7 results. When the calculations produce a fraction of a heart beat, as in the example, the value is rounded off to the nearest whole number. In this case, 160.7 BPM is rounded off to give a THR of 161 BPM. In summary, a reasonably fit 20-year-old soldier with a resting heart rate of 69 BPM has a training heart rate goal of 161 BPM. To determine the RHR, or to see if one is within the THR during and right after exercise, place the tip of the third finger lightly over one of the carotid arteries in the neck. These arteries are located to the left and right of the Adam's apple. (See Figure 2-1A.) Another convenient spot from which to monitor the pulse is on the radial artery on the wrist just above the base of the thumb. (See Figure 2-lB.) Yet another way is to place the hand over the heart and count the number of heartbeats. (See Figure 2-1 C.)

During aerobic exercise, the body will usually have reached a "Steady State" after five minutes of exercise, and the heart rate will have leveled off. At this time, and immediately after exercising, the soldier should monitor his heart rate.

He should count his pulse for 10 seconds, then multiply this by six to get his heart rate for one minute. This will let him determine if his training intensity is high enough to improve his CR fitness level.

For example, use the THR of 161 BPM figured above. During the 10-second period, the soldier should get a count of 27 beats (161/6= 26.83 or 27) if he is exercising at the right intensity. If his pulse rate is below the THR, he must exercise harder to increase his pulse to the THR. If his pulse is above the THR, he should normally exercise at a lower intensity to reduce the pulse rate to the prescribed THR. He should count as accurately as possible, since one missed beat during the 10-second count, multiplied by six, gives an error of six BPM.

A soldier who maintains his THR throughout a 20- to 30-minute exercise period is doing well and can expect improvement in his CR fitness level. He should check his exercise and post-exercise pulse rate at least once each workout. If he takes only one pulse check, he should do it five minutes into the workout.

Figure 2-2 is a chart that makes it easy to determine what a soldier's THR should be during a 10-second count. Using this figure, a soldier can easily find his own THR just by knowing his age and general fitness level. For example, a 40-year-old soldier with a low fitness level should, during aerobic exercise, have a THR of 23 beats in 10 seconds. He can determine this from the table by locating his age and then tracking upward until he reaches the percent HRR for his fitness level. Again, those with a low fitness level should work at about 60 percent HRR and those with a good fitness level at 70 percent HRR. Those with a high level of fitness may benefit most by training at 80 to 90 percent HRR.

Another way to gauge exercise intensity is "perceived exertion." This method relies on how difficult the exercise seems to be and is described in Appendix G.

### TIME

Time, or duration, refers to how long one exercises. It is inversely related to intensity. The more intense the activity, the shorter the time needed to produce and maintain a training effect; the less intense the activity, the longer the required duration. To improve CR fitness, the soldier must train for at least 20 to 30 minutes at his THR.

### TYPE

Only aerobic exercises that require breathing in large volumes of air improve CR fitness. Worthwhile aerobic activities must involve the use of large muscle groups and must be rhythmic. They must also be of sufficient duration and Intensity (60 to 90

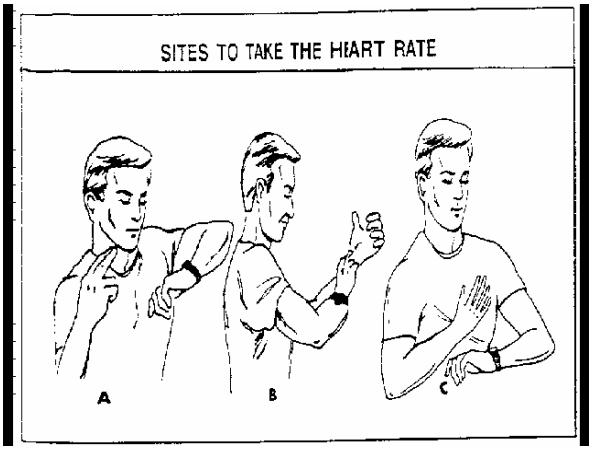


Figure 2-1

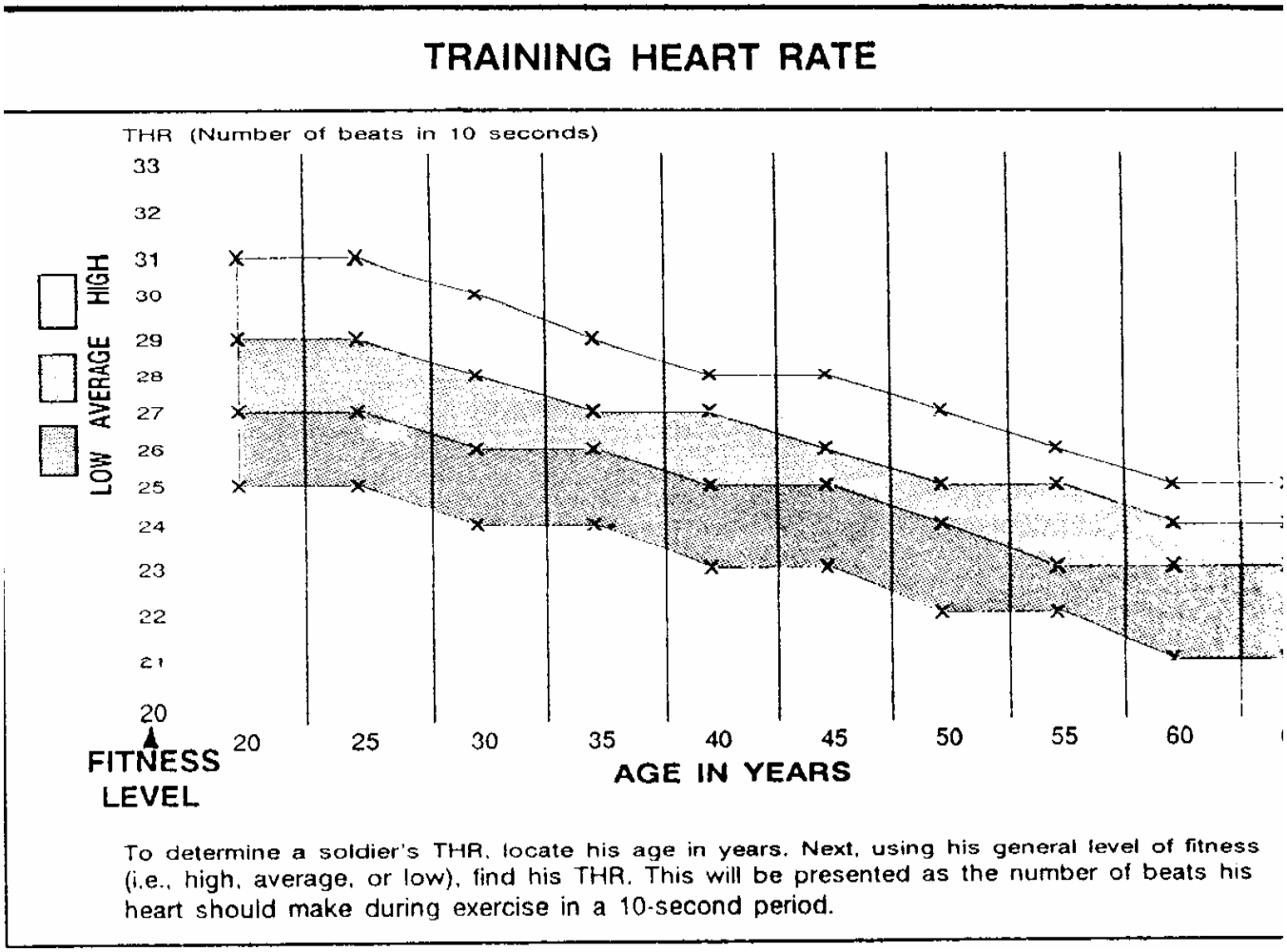


Figure 2-2

percent HRR). Examples of primary and secondary exercises for improving CR fitness are as follows:

**PRIMARY**
- Running.
- Rowing.
- Jogging.
- Skiing (cross-country).
- Walking (vigorous).
- Exercising to music.
- Road marching.
- Rope skipping.
- Bicycling (stationary).
- Swimming.
- Bicycling (road/street).
- Stair climbing.

**SECONDARY** (Done with partners or opponents of equal or greater ability.)
- Racquetball (singles).
- Basketball (full court).
- Handball (singles).
- Tennis (singles).

The primary exercises are more effective than the secondary exercises in producing positive changes in CR fitness.

The secondary activities may briefly elevate the heart rate but may not keep it elevated to the THR throughout the entire workout.

Every activity has its advantages and disadvantages. Trainers must weigh these and design programs that fit the unit's needs.

### Running

Running enables the body to improve the transport of blood and oxygen to the working muscles and brings about positive changes in the muscles' ability to produce energy. Running fits well into any physical training program 'because a training effect can be attained with only three 20-minute workouts per week.

Some soldiers may need instruction to improve their running ability. The following style of running is desired. The head is erect with the body in a straight line or slightly bent forward at the waist. The elbows are bent so the forearms are relaxed and held loosely at waist level. The arms swing naturally from front to rear in straight lines. (Cross-body arm movements waste energy. The faster the run, the faster the arm action.) The toes point straight ahead, and the feet strike on the heel and push off at the big toe.

Besides learning running techniques, soldiers need information on ways to prevent running injuries. The most common injuries associated with PT in the Army result from running and occur to the feet, ankles, knees, and legs. Proper warm-up and cool-down, along with stretching exercises and wearing appropriate clothing and well-fitting running shoes, help prevent injuries. Important information on safety factors and common running injuries is presented in Chapter 13 and Appendix E.

Failure to allow recovery between hard bouts of running cannot only lead to overtraining, but can also be a major cause of injuries. A well-conditioned soldier can run five to six times a week. However, to do this safely, he should do two things: 1) gradually buildup to running that frequently; and, 2) vary the intensity and/or duration of the running sessions to allow recovery between them.

**CHAPTER 3**

**Muscular Endurance and Strength**

On today's battlefield, in addition to cardiorespiratory fitness, soldiers need a high level of muscular endurance and strength. In a single day they may carry injured comrades, move equipment, lift heavy tank or artillery rounds, push stalled vehicles, or do many other strength-related tasks. For example, based on computer-generated scenarios of an invasion of Western Europe, artillerymen may have to load from 300 to 500, 155mm-howitzer rounds (95-lb rounds) while moving from 6 to 10 times each day over 8 to 12 days. Infantrymen may need to carry loads exceeding 100 pounds over great distances, while supporting units will deploy and displace many times. Indeed, survival on the battlefield may, in large part, depend on the muscular endurance and strength of the individual soldier.

## Muscular Fitness

Muscular fitness has two components: muscular strength and muscular endurance.

Muscular strength is the greatest amount of force a muscle or muscle group can exert in a single effort.

Muscular endurance is the ability of a muscle or muscle group to do repeated contractions against a less-than-maximum resistance for a given time.

Although muscular endurance and strength are separate fitness components, they are closely related. Progressively working against resistance will produce gains in both of these components.

## Muscular Contractions

Isometric, isotonic, and isokinetic muscular endurance and strength are best produced by regularly doing each specific kind of contraction. They are described here.

Isometric contraction produces contraction but no movement, as when pushing against a wall. Force is produced with no change in the angle of the joint. Isotonic contraction causes a joint to move through a range of motion against a constant resistance. Common examples are push-ups, sit-ups, and the lifting of weights.

Isokinetic contraction causes the angle at the joint to change at a constant rate, for example, at 180 degrees per second. To achieve a constant speed of movement, the load or resistance must change at different joint angles to counter the varying forces produced by the muscle(s) at different angles. This requires the use of isokinetic machines. There are other resistance-training machines which, while not precisely controlling the speed of movement, affect it by varying the resistance throughout the range of motion. Some of these devices are classified as pseudo-isokinetic and some as variable-resistance machines.

Isotonic and isokinetic contractions have two specific phases - the concentric or "positive" phase and the eccentric or "negative" phase. In the concentric phase (shortening) the muscle contracts, while in the eccentric phase (elongation) the muscle returns to its normal length. For example, on the upward phase of the biceps curl, the biceps are shortening. This is a concentric (positive) contraction. During the lowering phase of the curl the biceps are lengthening. This is an eccentric (negative) contraction.

A muscle can control more weight in the eccentric phase of contraction than it can lift concentrically. As a result, the muscle may be able to handle more of an overload eccentrically. This greater overload, in return, may produce greater strength gains. The nature of the eccentric contraction, however, makes the muscle and connective tissue more susceptible to damage, so there is more muscle soreness following eccentric work.

When a muscle is overloaded, whether by isometric, isotonic, or isokinetic contractions, it adapts by becoming stronger. Each type of contraction has advantages and disadvantages, and each will result in strength gains if done properly.

The above descriptions are more important to those who assess strength than to average people trying to develop strength and endurance. Actually, a properly design-ed weight training program with free weights or resistance machines will result in improvements in all three of these categories.

## Principles of Muscular Training

To have a good exercise program, the seven principles of exercise, described in Chapter 1, must be applied to all muscular endurance and strength training. These principles are overload, progression, specificity, regularity, recovery, balance, and variety.

## OVERLOAD

The overload principle is the basis for all exercise training programs. For a muscle to increase in strength, the workload to which it is subjected during exercise must be increased beyond what it normally experiences. In other words, the muscle must be overloaded. Muscles adapt to increased workloads by becoming larger and stronger and by developing greater endurance.

To understand the principle of overload, it is important to know the following strength-training terms:

- Full range of motion. To obtain optimal gains, the overload must be applied throughout the full range of motion. Exercise a joint and its associated muscles through its complete range starting from the pre-stretched position (stretched past the relaxed position) and ending in a fully contracted position. This is crucial to strength development.
- Repetition. When an exercise has progressed through one complete range of motion and back to the beginning, one repetition has been completed.
- One-repetition maximum (1-RM). This is a repetition performed against the greatest possible resistance (the maximum weight a person can lift one time). A 10-RM is the maximum weight one can lift correctly 10 times. Similarly, an 8-12 RM is that weight which allows a person to do from 8 to 12 correct repetitions. The intensity for muscular endurance and strength training is often expressed as a percentage of the 1-RM.
- Set. This is a series of repetitions done without rest.
- Muscle Failure. This is the inability of a person to do another correct repetition in a set.

The minimum resistance needed to obtain strength gains is 50 percent of the 1-RM. However, to achieve enough overload, programs are designed to require sets with 70 to 80 percent of one's 1-RM. (For example, if a soldier's 1-RM is 200 pounds, multiply 200 pounds by 70 percent [200 X 0.70 = 140 pounds] to get 70 percent of the 1-RM.)

A better and easier method is the repetition maximum (RM) method. The exerciser finds and uses that weight which lets him do the correct number of repetitions. For example, to develop both muscle endurance and strength, a soldier should choose a weight for each exercise which lets him do 8 to 12 repetitions to muscle failure. (See Figure 3-1.) The weight should be heavy enough so that, after doing from 8 to 12 repetitions, he momentarily cannot correctly do another repetition. This weight is the 8-12 RM for that exercise.

## MUSCULAR ENDURANCE/ STRENGTH DEVELOPMENT

To develop muscle strength, the weight selected should be heavier and the RM will also be different. For example, the soldier should find that weight for each exercise which lets him do 3 to 7 repetitions correctly. This weight is the 3-7 RM for that exercise. Although the greatest improvements seem to come from resistances of about 6-RM, an effective range is a 3-7 RM. The weight should be heavy enough so that an eighth repetition would be impossible because of muscle fatigue.

The weight should also not be too heavy. If one cannot do at least three repetitions of an exercise, the resistance is too great and should be reduced. Soldiers who are just beginning a resistance-training program should not start with heavy weights. They should first build an adequate foundation by training with an 8-12 RM or a 12+ RM.

To develop muscular endurance, the soldier should choose a resistance that lets him do more than 12 repetitions of a given exercise. This is his 12+ repetition

| FITT Factors Applied to Conditioning Programs for Muscular Endurance and/or Strength | | |
|---|---|---|
| **Muscular Strength** | **Muscular Endurance** | **Muscular Strength and Muscular Endurance** |
| 3 times/week | 3-5 time/week | 3 times/week |
| 3-7 RM* | 12+ RM | 8-12 RM |
| The time required to do 3-7 repetitions of each resistance exercise | The time required to do 12+ repetitions of each resistance exercise | The time required to do 8-12 repetitions of each resistance exercise |
| Free Weights<br>Resistance Machines<br>Partner-Resisted Exercises<br>Body-Weight Exercises (Push-ups/Sit-ups/Pull-ups/Dips, etc.) | | |
| * RM = Repetition Maximum | | |

Figure 3-1

maximum (12+ RM). With continued training, the greater the number of repetitions per set, the greater will be the improvement in muscle endurance and the smaller the gains in strength. For example, when a soldier trains with a 25-RM weight, gains in muscular endurance will be greater than when using a 15-RM weight, but the gain in strength will not be as great. To optimize a soldier's performance, his RM should be determined from an analysis of the critical tasks of his mission. However, most soldiers will benefit most from a resistance-training program with an 8-12 RM.

Whichever RM range is selected, the soldier must always strive to over-load his muscles. The key to overloading a muscle is to make that muscle exercise harder than it normally does.

An overload may be achieved by any of the following methods:

- Increasing the resistance.
- Increasing the number of repetitions per set.
- Increasing the number of sets.
- Reducing the rest time between sets.
- Increasing the speed of movement in the concentric phase. (Good form is more important than the speed of movement.)
- Using any combination of the above.

## PROGRESSION

When an overload is applied to a muscle, it adapts by becoming stronger and/or by improving its endurance. Usually significant increases in strength can be made in three to four weeks of proper training depending on

the individual. If the workload is not progressively increased to keep pace with newly won strength, there will be no further gains. When a soldier can correctly do the upper limit of repetitions for the set without reaching muscle failure, it is usually time to increase the resistance. For most soldiers, this upper limit should be 12 repetitions.

For example, if his plan is to do 12 repetitions in the bench press, the soldier starts with a weight that causes muscle failure at between 8 and 12 repetitions (8-12 RM). He should continue with that weight until he can do 12 repetitions correctly. He then should increase the weight by about 5 percent but no more than 10 percent. In a multi-set routine, if his goal is to do three sets of eight repetitions of an exercise, he starts with a weight that causes muscle failure before he completes the eighth repetition in one or more of the sets. He continues to work with that weight until he can complete all eight repetitions in each set, then increases the resistance by no more than 10 percent.

## SPECIFICITY

A resistance-training program should provide resistance to the specific muscle groups that need to be strengthened. These groups can be identified by doing a simple assessment. The soldier slowly does work-related movements he wants to improve and, at the same time, he feels the muscles on each side of the joints where motion occurs. Those muscles that are contracting or becoming tense during the movement are the muscle groups involved. If the soldier's performance of a task is not adequate or if he wishes to improve, strength training for the identified muscle(s) will be beneficial. To improve his muscular endurance and strength. in a given task, the soldier must do resistance movements that are as similar as possible to those of doing the task. In this way, he ensures maximum carryover value to his soldiering tasks.

## REGULARITY

Exercise must be done regularly to produce a training effect. Sporadic exercise may do more harm than good. Soldiers can maintain a moderate level of strength by doing proper strength workouts only once a week, but three workouts per week are best for optimal gains. The principle of regularity also applies to the exercises for individual muscle groups. A soldier can work out three times a week, but when different muscle groups are exercised at each workout, the principle of regularity is violated and gains in strength are minimal.

## RECOVERY

Consecutive days of hard resistance training for the same muscle group can be detrimental. The muscles must be allowed sufficient recovery time to adapt. Strength training can be done every day only if the exercised muscle groups are rotated, so that the same muscle or muscle group is not exercised on consecutive days. There should be at least a 48-hour recovery period between workouts for the same muscle groups. For example, the legs can be trained with weights on Monday, Wednesday, and Friday and the upper body muscles on Tuesday, Thursday, and Saturday.

Recovery is also important within a workout. The recovery time between different exercises and sets depends, in part, on the intensity of the workout. Normally, the recovery time between sets should be 30 to 180 seconds.

## BALANCE

When developing a strength training program, it is important to include exercises that work all the major muscle groups in both the upper and lower body. One should not work just the upper body, thinking that running will strengthen the legs.

Most muscles are organized into opposing pairs. Activating one muscle results in a pulling motion, while activating the opposing muscle results in the opposite, or pushing, movement. When planning a training session, it is best to follow a pushing exercise with a pulling exercise which results in movement at the same joint(s). For example, follow an overhead press with a lat pull-down exercise. This technique helps ensure good strength balance between opposing muscle groups

which may, in turn, reduce the risk of injury. Sequence the program to exercise the larger muscle groups first, then the smaller muscles. For example, the lat pull-down stresses both the larger latissimus dorsi muscle of the back and the smaller biceps muscles of the arm. If curls are done first, the smaller muscle group will be exhausted and too weak to handle the resistance needed for the lat pull-down. As a result, the soldier cannot do as many repetitions with as much weight as he normally could in the lat pull-down. The latissimus dorsi muscles will not be overloaded and, as a result, they may not benefit very much from the workout.

The best sequence to follow for a total-body strength workout is to first exercise the muscles of the hips and legs, followed by the muscles of the upper back and chest, then the arms, abdominal, low back, and neck. As long as all muscle groups are exercised at the proper intensity, improvement will occur.

## VARIETY

A major challenge for all fitness training programs is maintaining enthusiasm and interest. A poorly designed strength-training program can be very boring. Using different equipment, changing the exercises, and altering the volume and intensity are good ways to add variety, and they may also produce better results. The soldier should periodically substitute different exercises for a given muscle group(s). For example, he can do squats with a barbell instead of leg presses on a weight machine. Also, for variety or due to necessity (for example, when in the field), he can switch to partner-resisted exercises or another form of resistance training. However, frequent wholesale changes should be avoided as soldiers may become frustrated if they do not have enough time to adapt or to see improvements in strength.

**CHAPTER 4**

**Flexibility**

Flexibility is a component of physical fitness. Developing and maintaining it are important parts of a fitness program. Good flexibility can help a soldier accomplish such physical tasks as lifting, loading, climbing, parachuting, running, and rappelling with greater efficiency and less risk of injury.

Flexibility is the range of movement of a joint or series of joints and their associated muscles. It involves the ability to move a part of the body through the full range of motion allowed by normal, disease-free joints.

No one test can measure total-body flexibility. However, field tests can be used to assess flexibility in the hamstring and low-back areas. These areas are commonly susceptible to injury due, in part, to loss of flexibility. A simple toe-touch test can be used. Soldiers should stand with their legs straight and feet together and bend forward slowly at the waist. A soldier who cannot touch his toes without bouncing or bobbing needs work to improve his flexibility in the muscle groups stretched by this test. The unit's Master Fitness Trainer can help him design a stretching program to improve his flexibility.

Stretching during the warm-up and cool-down helps soldiers maintain overall flexibility. Stretching should not be painful, but it should cause some discomfort because the muscles are being stretched beyond their normal length. Because people differ somewhat anatomically, comparing one person's flexibility with another's should not be done. People with poor flexibility who try to stretch as far as others may injure themselves.

## STRETCHING TECHNIQUES

Using good stretching techniques can improve flexibility. There are four commonly recognized categories of stretching techniques: static, passive, proprioceptive neuromuscular facilitation (PNF), and ballistic. These are described here and shown later in this chapter.

### Static Stretching

Static stretching involves the gradual lengthening of muscles and tendons as a body part moves around a joint. It is a safe and effective method for improving flexibility. The soldier assumes each stretching position slowly until he feels tension or tightness. This lengthens the muscles without causing a reflex contraction in the stretched muscles. He should hold each stretch for ten seconds or longer. This lets the lengthened muscles adjust to the stretch without causing injury.

The longer a stretch is held, the easier it is for the muscle to adapt to that length. Static stretching should not be painful. The soldier should feel slight discomfort, but no pain. When pain results from stretching, it is a signal that he is stretching a muscle or tendon too much and may be causing damage.

### Passive Stretching

Passive stretching involves the soldier's use of a partner or equipment, such as a towel, pole, or rubber tubing, to help him stretch. This produces a safe stretch through a range of motion he could not achieve without help. He should talk with his partner to ensure that each muscle is stretched safely through the entire range of motion.

### PNF stretching

PNF stretching uses the neuromuscular patterns of each muscle group to help improve flexibility. The soldier performs a series of intense contractions and relaxations using a partner or equipment to help him stretch. The PNF technique allows for greater muscle relaxation following each contraction and increases the soldier's ability to stretch through a greater range of motion.

### Ballistic Stretching

Ballistic, or dynamic, stretching involves movements such as bouncing or bobbing to attain a greater range of motion and stretch. Although this method may improve flexibility, it often forces a muscle to stretch too far and may result in an injury. Individuals and units should not use ballistic stretching.

### FITT Factors

Commanders should include stretching exercises in all physical fitness programs.

The following FITT factors apply when developing a flexibility program.

- Frequency: Do flexibility exercises daily. Do them during the warm-up to help prepare the muscles for vigorous activity and to help reduce injury. Do them during the cool-down to help maintain flexibility.
- Intensity: Stretch a muscle beyond its normal length to the point of tension or slight discomfort, not pain.
- Time: Hold stretches for 10 to 15 seconds for warming up and cooling down and for 30 seconds or longer to improve flexibility.
- Type: Use static stretches, assumed slowly and gradually, as well as passive stretching and/or PNF stretching.

### Warm-Up and Cool-Down

The warm-up and cool-down are very important parts of a physical training session, and stretching exercises should be a major part of both.

### THE WARM-UP

Before beginning any vigorous physical activity, one should prepare the body for exercise. The warm-up increases the flow of blood to the muscles and tendons, thus helping reduce the risk of injury. It also increases the joint's range of motion and positively affects the speed of muscular contraction.

A recommended sequence of warm-up activities follows. Soldiers should do these for five to seven minutes before vigorous exercise.

- Slow jogging-in-place or walking for one to two minutes. This causes a gradual increase in the heart rate, blood pressure, circulation, and increases the temperature of the active muscles.
- Slow joint rotation exercises (for example, arm circles, knee/ankle rotations) to gradually increase the joint's range of motion. Work each major joint for 5 to 10 seconds.
- Slow, static stretching of the muscles to be used during the upcoming activity. This will "loosen up" muscles and tendons so they can achieve greater ranges of motion with less risk of injury. Hold each stretch position for 10 to 15 seconds, and do not bounce or bob.
- Calisthenic exercise, as described in Chapter 7, to increase the intensity level before the activity or conditioning period.
- Slowly mimic the activities to be performed. For example, lift a lighter weight to warm-up before lifting a heavier one. This helps prepare the neuromuscular pathways.

### THE COOL-DOWN

The cool-down helps the solider taper off gradually before stopping completely.

The following information explains the importance of cooling down and how to do it correctly.

- Do not stop suddenly after vigorous exercise, as this can be very dangerous. Gradually bring the body back to its resting state by slowly decreasing the intensity of the activity. After running, for example, one should walk for one to two minutes. Stopping exercise suddenly can cause blood to pool in the muscles, thereby reducing blood flow to the heart and brain. This may cause fainting or abnormal rhythms in the heart which could lead to serious complications.
- Repeat the stretches done in the warm-up to help ease muscle tension and any immediate feeling of muscle soreness. Be careful not to overstretch. The muscles are warm from activity and can possibly be
- overstretched to the point of injury.
- Hold stretches 30 seconds or more during the cool-down to improve flexibility. Use partner-assisted or PNF techniques, if possible.

The soldier should not limit flexibility training to just the warm-up and cool-down periods. He should sometimes use an entire PT session on a "recovery" or "easy" training day to work on flexibility improvement. He may also work on it at home. Stretching is one form of

exercise that takes very little time relative to the benefits gained.
*****

**Rotation Exercises**

Rotation exercises are used to gently stretch the tendons, ligaments, and muscles associated with a joint and to stimulate lubrication of the joint with synovial fluid. This may provide better movement and less friction in the joint. *****

**STATIC STRETCHES**

Assume all stretching positions slowly until you feel tension or slight discomfort. Hold each position for at least 10 to 15 seconds during the warm-up and cool-down. Developmental stretching to improve flexibility requires holding each stretch for 30 seconds or longer. Choose the appropriate stretch for the muscles groups which you will be working.
*****

**PASSIVE STRETCHES**

Passive Stretching is done with the help of a partner or equipment. The examples in this chapter show passive stretching done with a towel or with a partner. When stretching alone, using a towel may help the exerciser achieve a greater range of motion. *****

CHAPTER 5

Body Composition

Body composition, which refers to the body's relative amounts of fat and lean body mass (organs, bones, muscles), is one of the five components of physical fitness. Good body composition is best gained through proper diet and exercise. Examples of poor body composition are underdeveloped musculature or excessive body fat. Being overweight (that is, overly fat) is the more common problem.

Poor body composition causes problems for the Army. Soldiers with inadequate muscle development cannot perform as well as soldiers with good body composition. As a soldier gets fat, his ability to perform physically declines, and his risk of developing disease increases. Soldiers with high percentages of body fat often have lower APFT scores than those with lower percentages. Poor body composition, especially obesity, has a negative effect on appearance, self-esteem, and negatively influences attitude and morale.

The Army's weight control program is described in AR 600-9. It addresses body composition standards, programs for the overly fat, and related administrative actions.

The amount of fat on the body, when expressed as a percentage of total body weight, is referred to as the percent body fat. The Army's maximum allowable percentages of body fat, by age and sex, are listed in Figure 5-1.

**Evaluation Methods**

The Army determines body fat percentage using the girth method. (This is described in AR 600-9, pages 12-21.)

Body composition is influenced by age, diet, fitness level, and genetic factors (gender and body type). The Army's screening charts for height and weight (shown in AR 600-9) make allowances for these differences. A soldier whose weight exceeds the standard weight shown on the charts may not necessarily be overfat. For example, some well-muscled athletes have body weights that far exceed the values for weight listed on the charts for their age, gender, and height. Yet, only a small percentage of their total body mass may be fat. In such cases, the lean body mass accounts for a large share of their total body composition, while only a small percentage of the total body mass is composed of fat.

Soldiers who do not meet the weight standards for their height and/or soldiers whose appearance suggests that they have excessive fat are to be evaluated using the circumference (girth measurement) method described in AR 600-9.

A more accurate way to determine body composition is by hydrostatic or underwater weighing. However, this method is very time-consuming and expensive and usually done only at hospitals and universities.

Soldiers who do not meet Army body fat standards are placed on formal, supervised weight (fat) loss programs as stipulated in AR 600-9. Such programs include sensible diet and exercise regimens.

**Diet and Exercise**

A combination of exercise and diet is the best way to lose excessive body fat. Losing one to two pounds a week is a realistic goal which is best accomplished by reducing caloric intake and increasing energy expenditure. In other words, one should eat less and exercise more. Dieting alone can cause the body to believe it is being starved. In response, it tries to conserve its fat reserves by slowing down its metabolic rate and, as a result, it loses fat at a slower rate.

| BODY FAT STANDARDS | | | | |
|---|---|---|---|---|
| AGES | 17-20 | 21-27 | 28-39 | 40+ |
| MALES 20% | 20% | 22% | 24% | 26% |
| FEMALES | 30% | 32% | 34% | 36% |

Figure 5-1

Soldiers must consume a minimum number of calories from all the major food groups, with the calories distributed over all the daily meals

including snacks. This ensures an adequate consumption of necessary vitamins and minerals. A male soldier who is not under medical super-vision when dieting requires a caloric intake of at least 1,500; women require at least 1,200 calories. Soldiers should avoid diets that fail to meet these criteria.

Trying to lose weight with fad diets and devices or by skipping meals does not work for long-term fat loss, since weight lost through these practices is mostly water and lean muscle tissue, not fat. Losing fat safely takes time and patience. There is no quick and easy way to improve body composition.

The soldier who diets and does not exercise loses not only fat but muscle tissue as well. This can negatively affect his physical readiness. Not only does exercise burn calories, it helps the body maintain its useful muscle mass, and it may also help keep the body's metabolic rate high during dieting.

Fat can only be burned during exercise if oxygen is used. Aerobic exercise, which uses lots of oxygen, is the best type of activity for burning fat. Aerobic exercises include jogging, walking, swimming, bicycling, cross-country skiing, rowing, stair climbing, exercise to music, and jumping rope. Anaerobic activities, such as sprinting or lifting heavy weights, burn little, if any, fat.

Exercise alone is not the best way to lose body fat, especially in large amounts. For an average-sized person, running or walking one mile burns about 100 calories. Because there are 3,500 calories in one pound of fat, he needs to run or walk 35 miles if pure fat were being burned. In reality, fat is seldom the only source of energy used during aerobic exercise. Instead, a mixture of both fats and carbohydrates is used. As a result, most people would need to run or walk over 50 miles to burn one pound of fat.

A combination of proper diet and aerobic exercise is the proven way to lose excessive body fat. Local dietitians and nutritionists can help soldiers who want to lose weight by suggesting safe and sensible diet programs. In addition, the unit's MFT can design tailored exercise programs which will help soldiers increase their caloric expenditure and maintain their lean body mass.

## CHAPTER 10

## Developing the Program

The goal of the Army's physical fitness program is to improve each soldier's physical ability so he can survive and win on the battlefield. Physical fitness includes all aspects of physical performance, not just performance on the APFT. Leaders must understand the principles of exercise, the FITT factors, and know how to apply them in order to develop a sound PT program that will improve all the fitness components. To plan PT successfully, the commander and MFT must know the training management system. (See FM 25-100.)

Commanders should not be satisfied with merely meeting the minimum requirements for physical training which is having all of their soldiers pass the APFT. They must develop programs that train soldiers to maximize their physical performance. Leaders should use incentives. More importantly, they must set the example through their own participation.

Commanders must develop programs that train soldiers to maximize their physical performance.

The unit PT program is the commander's program. It must reflect his goals and be based on sound, scientific principles. The wise commander also uses his PT program as a basis for building team spirit and for enhancing other training activities. Tough, realistic training is good. However, leaders must be aware of the risks involved with physical training and related activities. They should, therefore, plan wisely to minimize injuries and accidents.

### Steps in Planning

### STEP 1: ANALYZE THE MISSION

When planning a physical fitness program, the commander must consider the type of unit and its mission. Missions vary as do the physical requirements necessary to complete them. As stated in FM 25-100, "The wartime mission drives training." A careful analysis of the mission, coupled with the commander's intent, yields the mission-essential task list (METL) a unit must perform.

Regardless of the unit's size or mission, reasonable goals are essential. According to FM 25-100, the goals should provide a common direction for all the commander's programs and systems. An example of a goal is as follows because the exceptional physical fitness of the soldier is a critical combat-multiplier in the division, it must be our goal to ensure that our soldiers are capable of roadmarching 12 miles with a 50-pound load in less than three hours.

### STEP 2: DEVELOP FITNESS OBJECTIVES

Objectives direct the unit's efforts by prescribing specific actions. The commander, as tactician, and the MFT, as physical fitness advisor, must analyze the METL and equate this to specific fitness objectives. Examples of fitness objectives are the following:

- Improve the unit's overall level of strength by ensuring that all soldiers in the unit can correctly perform at least one repetition with 50 percent of their bodyweight on the overhead press using a barbell.
- Improve the unit's average APFT score through each soldier obtaining a minimum score of 80 points on the push-up and sit-up events and 70 points on the 2-mile run.
- Decrease the number of physical training injuries by 25 percent through properly conducted training.

The commander and MFT identify and prioritize the objectives.

### STEP 3: ASSESS THE UNIT

With the training objectives established, the commander and MFT are ready to find the unit's current fitness level and measure it against the desired level.

Giving a diagnostic APFT is one way to find the current level. Another way is to have the soldiers road march a certain distance within a set time while carrying a specified load. Any quantifiable, physically demanding, mission-essential task can be used as an assessment tool. Training records and reports, as well as any previous ARTEP, EDREs, and so forth, can also provide invaluable information.

### STEP 4: DETERMINE TRAINING REQUIREMENTS

By assessing the unit's fitness capabilities and comparing them to the standards defined in training objectives, leaders can determine fitness training requirements. When, after extensive training, soldiers cannot reach the desired levels of fitness, training requirements may be too idealistic. Once training requirements are determined, the commander reviews higher headquarters' long- and short-range training plans to identify training events and allocation of resources which will affect near-term planning.

### STEP 5: DEVELOP FITNESS TASKS

Fitness tasks provide the framework for accomplishing all training requirements. They identify what has to be done to correct all deficiencies and sustain all proficiencies. Fitness tasks establish priorities, frequencies, and the sequence for training requirements. They must be adjusted for real world constraints before they become a part of the training plan. The essential elements of fitness tasks can be cataloged into four groups:

(1) Collective tasks
(2) Individual tasks
(3) Leader tasks
(4) Resources required for training

Collective tasks. Collective tasks are the training activities performed by the unit. They are keyed to the unit's specific fitness objectives. An example would be to conduct training to develop strength and muscular endurance utilizing a sandbag circuit.

Individual tasks. Individual tasks are activities that an individual soldier must do to accomplish the collective training task. For example, to improve CR endurance the individual soldier must do ability-group running, road marching, Fartlek training, interval training, and calculate/monitor his THR when appropriate.

Leader tasks. Leader tasks are the specific tasks leaders must do in order for collective and individual training to take place. These will involve procuring resources, the setting up of training, education of individual soldiers, and the supervision of the actual training.

Resources. Identifying the necessary equipment, facilities, and training aids during the planning phase gives the trainer ample time to prepare for the training. The early identification and acquisition of resources is necessary to fully implement the training program. The bottom line is that training programs must be developed using resources which are available.

### STEP 6: DEVELOP A TRAINING SCHEDULE

The fitness training schedule results from leaders' near-term planning. Leaders must emphasize the development of all the fitness components and follow the principles of exercise and the FITT factors. The training schedule shows the order, intensity, and duration of activities for PT. Figure 10-1 illustrates a typical PT session and its component parts.

There are three distinct steps in planning a unit’s daily physical training activities. They are as follows:

1. Determine the minimum frequency of training. Ideally, it should include three cardiorespiratory and three muscular conditioning sessions each week. (See the FITT factors in Chapter 1.)
2. Determine the type of activity. This depends on the specific purpose of the training session. (See Figure 10-2.) For more information on this topic, see Chapters 1, 2, and 3.
3. Determine the intensity and time of the selected activity. (See the FITT factors in Chapter 1.)

Each activity period should include a warm-up, a workout that develops cardiorespiratory fitness and/or muscular endurance and strength, and a cool-down. (See Figure 10-1.)

At the end of a well-planned and executed PT session, all soldiers should feel that they have been physically stressed. They should also understand the objective of the training session and how it will help them improve their fitness levels.

### STEP 7: CONDUCT AND EVALUATE TRAINING

The Commander and MFT now begin managing and supervising the day-to-day

training. They evaluate how the training is performed by monitoring its intensity, using THR or muscle failure, along with the duration of the daily workout.

The key to evaluating training is to determine if the training being conducted will result in improvements in physical conditioning. I not, the training needs revision. Leaders should not be side tracked by PT that is all form and little substance. Such training defeats the concept of objective-based training and results in little benefit to soldiers.

### Education

Teaching soldiers about physical fitness is vital. It must be an ongoing effort that uses trained experts like MFTs. Soldiers must understand why the program is organized the way it is and what the basic fitness principles are. When they know why they are training in a certain way, they are more likely to wholeheartedly take part. This makes the training more effective.

Education also helps the Army develop its total fitness concept. Total fitness should be reinforced throughout each soldier's career. Classroom instruction in subjects such as principles of exercise, diet and nutrition, tobacco cessation, and stress management should be held at regular intervals. Local "Fit To Win" coordinators (AR 600-63) can help develop classes on such subjects.

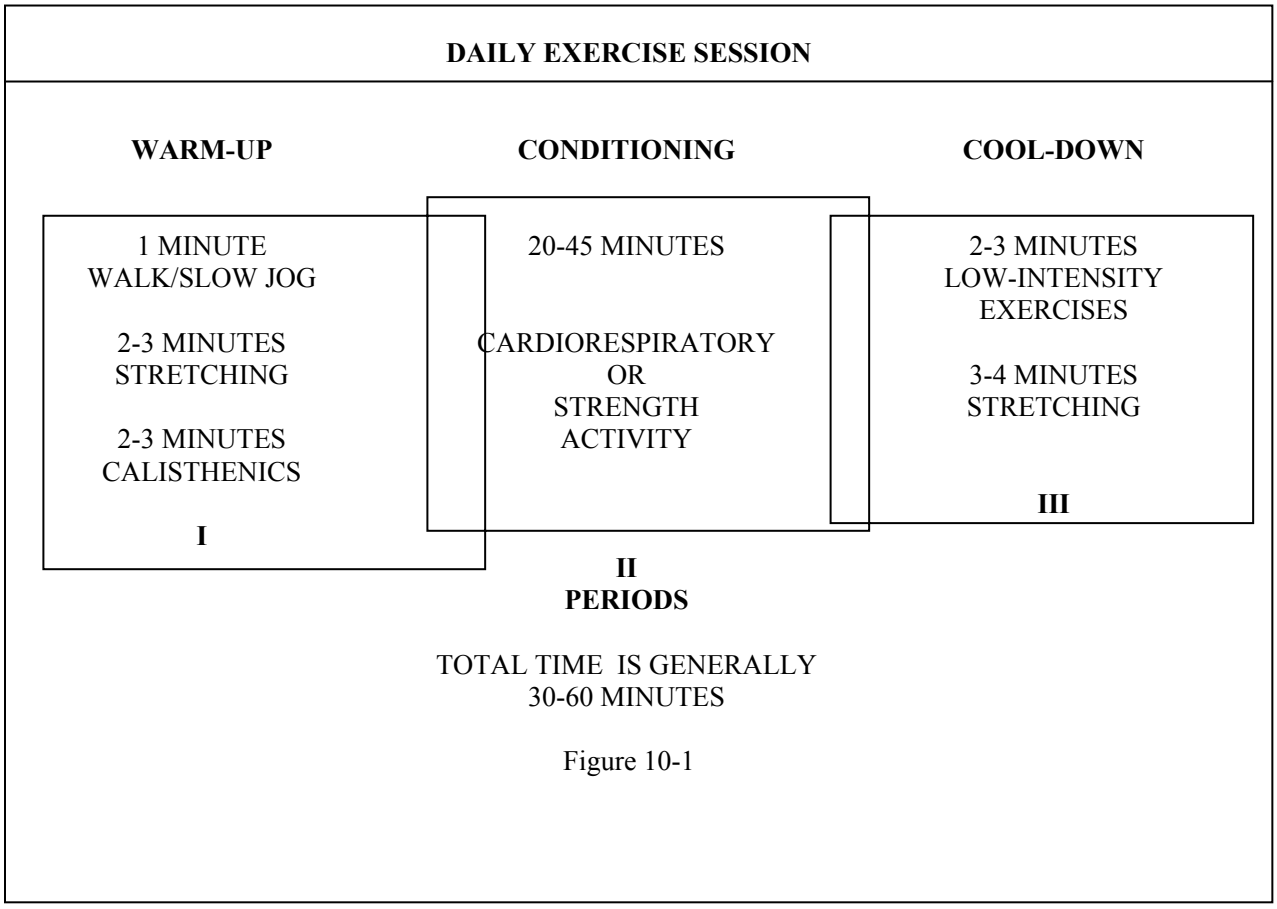


Figure 10-1

**Activity Selection Guide**

| PURPOSE | MUSCULAR STRENGTH | MUSCULAR ENDURANCE | CARDIO-RESPIRATORY ENDURANCE | FLEXI-BILITY | BODY COMPO-SITION | SPEED/ AGILITY | COORDI-NATION | TEAM/ WORK | SOLDIER SKILLS |
|---|---|---|---|---|---|---|---|---|---|
| Aerobics | | X | X | X | X | | X | | |
| Bicycling | | X | X | | X | | | | |
| Circuits | X | X | X | X | X | X | X | X | X |
| Competitive Activities | | | | | | X | X | X | X |
| Calisthenics | | X | | X | | X | X | | |
| Cross Country Skiing | X | X | X | X | X | | X | | |
| Grass/Guerrilla Drills | X | X | X | | X | | X | | |
| Obstacle Courses | X | X | X | | X | X | X | X | X |
| Partner-Resisted Exercises | X | X | | | | | X | X | |
| Relays | | X | X | | X | X | X | X | |
| Rifle Drills | X | X | | | | | X | | X |
| Road Marching | X | X | X | | X | | | | X |
| Running | | X | X | | X | | | | |
| Stretching | | | | X | | | | | |
| Weight Training | X | X | | | | X | X | | |

Figure 10-2

## Common Errors

There are some common errors in unit programs. The most common error concerns the use of unit runs. When all soldiers must run at the same pace as with a unit run, many do not reach their training heart rate (THR). The least-fit soldiers of the unit may be at risk because they may be training at heart rates above their THR. Another error is exclusively using activities such as the "daily dozen." These exercises emphasize form over substance and do little to improve fitness.

Yet another error is failing to strike a balance in a PT program between CR endurance training and muscular endurance and strength training. In addition, imbalances often stem from a lack of variety in the program which leads to boredom. The principles of exercise are described in Chapter 1, and their application is shown in the sample program below.

## A Sample Program

The following sample program shows a commander's thought processes as he develops a 12-week fitness training program for his unit.

Captain Frank Jones's company has just returned from the field where it completed an ARTEP. Several injuries occurred including a broken foot, resulting from a dropped container, and three low back strained. After evaluating his unit during this ARTEP, CPT Jones concluded that its level of physical fitness was inadequate. He thought this contributed to the injuries and poor performance. The soldier's flexibility was poor,

and there was an apparent lack of prior emphasis on, and training in, good lifting, techniques. This, combined with poor flexibility in the low back and hamstrings, may have contributed to the unacceptably high number of low back strains. Captain Jones decided to ask the battalion's MFT to help him develop a good unit program for the company. They went through the following steps:

## 7-STEP PLANNING PROCESS

ANALYZE THE MISSION
DEVELOP FITNESS OBJECTIVES
ASSESS THE UNIT
DETERMINE TRAINING REQUIREMENTS
DESIGN FITNESS TASKS
DEVELOP A TRAINING SCHEDULE
CONDUCT AND EVALUATE TRAINING

## ANALYZE THE MISSION

First, they analyzed the recently completed ARTEP and reviewed the ARTEP manual to find the most physically demanding, mission-oriented tasks the unit performs. The analysis showed that, typically, the company does a tactical road march and then occupies a position. It establishes a perimeter, improves its position, and selects and prepares alternate positions. One of the most demanding missions while in position requires soldiers to move by hand, for 15 to 30 minutes, equipment weighing up to 90 pounds. If his unit received artillery fire, it would need to be able to move to alternate positions as quickly as possible. This re-quires much lifting, digging, loading, Unloading-loading, and moving of heavy equipment. All of these tasks require good muscular endurance and strength and a reasonable level of cardiorespiratory endurance.

## DEVELOP FITNESS OBJECTIVES

Next CPT Jones reviewed his battalion commander's physical training guidance. It showed that the commander was aware that the unit's tasks require muscular endurance and strength and cardiorespiratory fitness. The guidance and objectives issued are as follows:

a. Units will do PT five days a week (0600-0700) when in garrison. In the field, organized PT will be at the commander's discretion.

Captain Jones determined that the major PT emphasis should be to improve muscular endurance and strength. He based this on his unit's mission, training schedule, available resources, and on his commander's guidance and objectives. With this information and the MFTs recommendations, CPT Jones developed the following fitness objectives,

- Improve the unit's overall level of muscular endurance and strength.
- Improve the unit's overall level of flexibility.
- Improve the unit's average APFT score. Each soldier will score at least 80 points on the push-up and sit-up events and 70 points on the 2-mile run.
- Improve the unit's road marching capability so that 100 percent of the unit can complete a 12-mile road march with a 35 pound load in at least 3.5 hours.
- Reduce tobacco use.

## ASSESS THE UNIT

The next step CPT Jones accomplished was to assess his unit.

The MFT studied the results of the unit's latest APFT and came up with the following information.:

- The average push-up score was 68 points.
- The average sit-up score was 72 points.
- The average number points scored on the 2-mile run was 74.
- There were six failures, two on the 2-mile run and four on the push-up.

The MFT also recommended that the unit be assessed in the following areas: road march performance, strength, flexibility, substance abuse, and profiled soldiers.

Following the MFT's recommendations, subordinate leaders made the following assessments/determinations:

- Eighty-eight percent of the company finished the 12-mile road march with a 35-pound load in under 3 hours 30 minutes.
- A formation toe-touch test revealed that over half the company could not touch their toes while their knees were extended.
- Thirty percent of the unit uses tobacco.
- Two soldiers are in the overweight program.
- Eight percent of the unit is now on temporary profile, most from back problems.

## DETERMINE TRAINING REQUIREMENTS

The next step CPT Jones accomplished was to determine the training requirements.

Training requirements are determined by analyzing the training results and the data obtained from the unit assessment. The next step is to compare this data to the standards identified in the training objectives. When performance is less than the established standard, the problem must be addressed and corrected.

Captain Jones established the following training requirements.

Units will do flexibility exercises during the warm-up and cool-down phase of every PT session. During the cool-down, emphasis on will be placed on developing flexibility in the low back, hamstrings, and hip extensor muscle groups.

Each soldier will do 8 to 12 repetitions of bent-leg, sandbag dead-lifts at least two times a week to develop strength. The section leader will supervise lifts.

Each soldier will do heavy resistance/weight training for all the muscle groups of the body two to three times a week.

Each soldier will perform timed sets of push-ups and sit-ups.

Each soldier will train at least 20 to 30 minutes at THR two to three times a week.

Road marches will be conducted at least once every other week.

Tobacco cessation classes will be established to reduce the number of tobacco users.

## DESIGN FITNESS TASKS

Once all training requirements are identified, the next step is to use them to design fitness tasks which relate to the fitness objectives. In developing the fitness tasks, CPT Jones must address collective, individual, and leader tasks as well as resources required.

Fitness tasks provide the framework for accomplishing the training requirements. by accurately listing the fitness tasks that must be done and the resources required to do them, the subsequent step if developing a training schedule is greatly facilitated.

An example of designing fitness tasks is provided in Figure 10-3 by using the activities which might occur during one week of physical training.

The collective tasks all soldiers must perform during the week are as follows. For developing strength and muscular endurance, they must perform appropriate strength circuit exercises, PREs, sandbag circuits, to include performing bent-leg dead lifts exercises, and training for push-up/sit-up improvement. To improve cardiorespiratory endurance, they must do ability-group runs, interval training, road marching, and they must calculate their THR and monitor their daily warm-up and cool-down.

The leader's tasks are to organize and supervise all strength-and muscle endurance-training sessions and CR training sessions so as to best meet all related fitness objectives for the development and maintenance of flexibility.

To provide specific examples of leaders tasks in the area of training for strength and muscle endurance, the leader will ensure the following:

- Each strength-and/or muscle endurance-training session works all the major muscle groups of the body.
- High priority is given to training those muscles and muscle groups used in mission-essential tasks.
- Areas where weaknesses exist, with respect to strength/muscle endurance, are targeted in all workouts,
- Problem areas related to APFT performance are addressed in appropriate workshops.

**FITNESS TASKS FOR ONE WEEK OF PHYSICAL TRAINING**

| COLLECTIVE | INDIVIDUAL | LEADER | RESOURCES |
|---|---|---|---|
| Improve strength and muscle endurance | Do STR CIR EX*, PRE, SNDBG CIR | Organize & supervise STR CIR EX, PRE, & SNDBG CIR | STR RM, Gym Sandbags, PT Field |
| Improve CR endurance | Do AGR, CAL, MON THR, road march, do intervals (4X440) IND AB | Organize & supervise CR workouts, CAL/MON THR, MON work/relief | Track, Running Trails |

| | | | |
|---|---|---|---|
| Improve flexibility | Do stretching exercises | ratio for intervals<br><br>Organize & supervise activity | GYM |
| * A list of abbreviations appears at the end of Figure 10-4. | | | |

Figure 10-3

The duration of each strength training session is 20-40 minutes.

- Soldiers train to muscle failure.
- All the principles of exercise, to include regularity, overload, recovery, progression, specificity, and balance are used.

In a similar manner, the leader would ensure that the guidelines and principles outlined in this and earlier chapters are used to organize training sessions for improving CR endurance and flexibility.

The resources needed for the one-week period are as follows: a strength room, a gym, a PT field, a running track, and/or running trails, and sandbags.

## DEVELOP A TRAINING SCHEDULE

The next step was to develop a fitness training schedule (shown at Figure 10-4). It lists the daily activities and their intensity and duration.

| 12-WEEK TRAINING PLAN | | | | |
|---|---|---|---|---|
| JULY | | | | |
| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
| START ASSESSMENT*<br>ACT: AGR**<br>INT: 70% HRR***<br>DUR: 20 MIN<br><br>ACT: PLT 1 & 2 WT STR CIR: PLT 3 & 4 SNDBG CIR/PU-SU IMP<br>INT: MF<br>DUR: 30-35/4 MIN<br><br>ACT: FIXED CIR 1<br>INT: 70% HRR<br>DUR: 30-4- MIN<br><br>ACT: PLT 1 & 2 STR CIR: PLT 3 & 4 SNDBG CIR/PU-SU IMP<br>INT: MF<br>DUR: 30-40/5 MIN | FINISH ASSESSMENT<br>ACT: PLT 1 & 2 STR CIR; PLT 3 & 4 SNDBG CIR/PU-SU IMP<br>INT: MF/MF<br>DUR: 30/4 MIN<br><br>ACT: AGR/ PAR COURSE<br>INT: 70% HRR<br>DUR: 20/15-20 MIN<br><br>ACT: PRE/PU-SU IMP<br>INT: MF<br>DUR: 40/5 MIN<br><br>ACT: AGR<br>INT:70% HRR | ACT: AGR/LINE SOCCOR<br>INT: 70% HRR<br>DUR: 35/4 MIN<br><br>FLIP - FLOP MONDAY'S WORKOUT<br><br>ACT: AGR/GDR<br>INT: 70% HRR<br>DUR: 22/20 MIN<br><br>FLIP - FLOP MONDAY'S WORKOUT | ACT: PRE/PU/SU IMP<br>INT: MF<br>DUR: 35/4 MIN<br><br>ACT: AGR/GDR<br>INT: 70% HRR<br>DUR: 20/15-20 MIN<br><br>ACT: SNDBG CIR/PU-SU IMP<br>INT: MF<br>DUR: 35-40/5 MIN<br><br>ACT: AGR<br>INT: 70% HRR<br>DUR: 25 MIN | ACT: ROAD MARCH, 5 MLE W 35 LBS IN 90 MIN<br><br>ACT: PRE/PU-SU IMP<br>INT: M-F<br>DUR: 35/4 MIN<br><br>ACT: ROAD MARCH, 5 MLE W 35 LBS IN 90 MIN<br><br>ACT: OBS CRS/PRE/PU-SU IMP<br>INT: MF |

| | | | | |
|---|---|---|---|---|
| | DUR: 25 MIN | | | DUR: 25/20/5 MIN |

* Initially, assessments must be made of each soldier's level of physical fitness. Particularly important is assessing a soldier's strength and muscular endurance by determining his 8-12 RM for each resistance exercise he will be doing. As mentioned in the Phases of Conditioning section in Chapter 3, this will take two weeks and should be planned for accordingly. The other components of fitness should also be addressed as the need arises.

** A list of abbreviations and acronyms appears at the end of this training plan.

*** Those soldiers with a fairly good level of CR fitness (that is, the average soldier) should exercise at about 70 percent HRR. Those with very high levels of fitness may benefit most from training at around 80 to 85 percent HRR during a CR training workout.

Figure 10-4

| 12-WEEK TRAINING PLAN | | | | |
|---|---|---|---|---|
| AUGUST | | | | |
| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
| ACT: AGR<br>INT: 70%HRR<br>DUR: 27 MIN | ACT: PLT 1 & 2 SNDBG CIR<br>PLT 3 & 4 PRE/UP-SU IMP<br>INT: MF<br>DUR: 40/6 | ACT: INTERVALS<br>INT:8 X 440<br>IND: AB<br>DUR: 45 MIN | FLIP - FLOP TUESDAY'S WORKOUT | ACT: ROAD MARCH, 7.5 W 35 LBS IN 2.5 HRS |
| ACT: PLT 1 & 2 SNDBG CIR;<br>PLT 3 & 4 STR CIR/PU-SU IMP<br>INT: MF<br>DUR:40/6 MIN | ACT: LAST MAN-UP RUN IN AG/PAR CRS<br>INT: 70-80% HRR*/70% HRR<br>DUR: 30/20 MIN | FLIP - FLOP MONDAY'S WORKOUT | ACT: AGR/FITNESS RELAYS<br>INT: 70% HRR/NA<br>DUR: 30/20 MIN | ACT: PLT 1 & 2 SNDBG CIR:<br>PLT 3 & 4 PRE/PU-SU IMP<br>INT:: MF<br>DUR: 40/6 MIN |
| IN FIELD:<br>PLAN FOR | IN FIELD:<br>PLAN FOR | IN FIELD:<br>PLAN FOR | IN FIELD:<br>PLAN FOR | IN FIELD:<br>PLAN FOR |
| ACT: LAST MAN -UP<br>RUN IN AG<br>INT: 70-90% HRR*<br>DUR: 32MIN | ACT: PRE/PU-SU IMP<br>INT: MF<br>DUR: 40/5 MIN | ACT: FARTLEK IN AG<br>INT: 60-90% HRR*<br>DUR: 32 MIN | ACT: PU-SU, PULL-UP IMP<br>INT: MF<br>DUR: 40/8 MIN | ACT: ROAD MARCH, 10 MLE W 35 LBS IN 3.5 HOURS |
| ACT: PRE/PU-SU IMP<br>INT: MF<br>DUR:35/10 MIN | ACT: INTERVALS<br>INT: 8 X 440<br>IND AB<br>DUR: 45 MIN | ACT: PU-SU, PULL-UP IMP<br>INT: MF<br>DUR: 45 MIN | ACT: FARTLEK IN AG<br>INT: 60-90% HRR*<br>DUR: 35 MIN | ACT: PU-SU, PULL-UP IMP<br>INT: MF<br>DUR: 45 MIN<br>LC: APFT FOR GRADERS |

* During the Last-Man-Up and Fartlek running, the heart rate will vary depending on whether it is taken during the slower or the faster portion of the run. The smaller and larger numbers provided for percent HRR should set the lower and upper limits, respectively, for a soldier's heart rate during this type of training. During interval running, the soldier should concern himself with running at the appropriate pace; he should not monitor THR during interval work.

Figure 10-4 (continued)

| 12-WEEK TRAINING PLAN | | | | |
|---|---|---|---|---|
| SEPTEMBER | | | | |
| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
| ACT:DEVELMEN T-AL STRETCHING<br>INT: SLIGHT TENSION, NOT PAIN<br>DUR: 20-30 MIN | ACT: APFT<br>DUR: NA | ACT: UNIT OLYMPICS, PART 1<br>DUR: NA | ACT: UNIT OLYMPICS, PART II<br>DUR: N/A | ACT: APFT & OLYMPIC AWARDS CEREMONY/UNI T RUN<br>INT: NA/CD<br>DUR: NA/30-40 MIN |
| ACT: PLT 1 & 2 STR CIR;<br>PLT 3 & 4 PRE<br>INT: MF<br>DUR: 40 MIN | ACT: PLT 1 & 2<br>AGR: PLT 3 & 4 EX TO MUSIC<br>INT: 70% HRR<br>DUR: 35/45 MIN | FLIP - FLOP MONDAY'S WORKOUT | ACT: ROAD MARCH, 10 MLE W 35 LBS IN 3 HOURS | ACT: PLT 1 & 2 SNDBG CIR:<br>PLT 3 & 4 PRE<br>INT:: MF<br>DUR: 40 MIN |
| ACT: AGR<br>INT: 70% HRR<br>DUR: 35 MIN | ACT: PRE/PU-SU IMP<br>INT: MF<br>DUR: 40/8 MIN | ACT: FIXED CIRCUIT/RELAY S<br>INT: 70% HRR/NA<br>DUR: 20/20 MIN | ACT: UPPER BODY PRE/PU-SU IMP<br>INT: MF<br>DUR: 30/8 MIN | ACT: ROAD MARCH, 12 MLE W 35 LBS IN UNDER 4 HOURS |
| ACT: PLT 1 &2 LOG DRILLS; PLT 3 & 4 SNDBG CIR/PU-SU IMP<br>INT: MF<br>DUR: 30/8 MIN | ACT: PLT 1 & 2 FIXED CIR;<br>PLT 3 & 4 AQUATICS<br>INT: 70% HRR/NA<br>DUR: 30 MIN | FLIP-FLOP MONDAY'S WORKOUT | FLIP - FLOP TUESDAY'S WORKOUT | ACT: PRE /PU-SU, IMP<br>INT: MF<br>DUR: 35/8 MIN |

1. Push-ups and sit-ups are done as part of each strength workout. In the above sessions, they have been placed near the end of the workout. However, they can occasionally be done before the strength workout for variety. An example of a beginning PU-SU improvement workout lasting about three minutes follows:

a. Perform one timed set of push-ups for 50 seconds. Follow this immediately with one 50-second, timed set of sit-ups. For all timed sets, each soldier must perform as many repetitions of the exercise as he can during the allotted time period.

b. Perform a second set of push-ups for 40 seconds. Follow this immediately with a timed set of sit-ups of equal duration.

As the soldier adapts to this, the difficulty of the session can be increased by adding more timed sets and/or by decreasing the rest interval between like or unlike sets of exercises. For example, the rest period between timed sets of push-ups and sit-ups can be decreased. Also, all of the timed sets for push-ups may be done back-to-back (as can the sit-ups), the rest interval between these timed sets of push-ups can be progressively reduced to make the workout more demanding. Many more options exist for increasing the difficulty of, and adding variety to, these sessions.

2. Activities are planned for the FTX; duration is determined n site.
3. The unit's Olympic events include the following:
   a. Ammo-box shuttle-run (fastest time by section).
   b. Biceps, barbell curl (most reps with 60 lbs., total by section).
   c. Leg press (most weight lifted by section).
   d. Standing-toe touch (most soldiers touching toes by section/must hold five seconds).
   e. Highest APFT score by section.

Figure 10-4 (continued)

| ABBREVIATIONS AND ACRONYMS | |
|---|---|
| ACT | activity |
| AG | ability groups |
| AGR | ability group run |
| ANA ACT | anaerobic activity |
| AOTR | assessment of training requirements |
| CAL/MON | calculate/monitor |
| CD | commander's decision |
| CFA | competitive fitness activities |
| CIR | circuit |
| CR | cardiorespiratory training |
| DL | dead-lift |
| EX | exercise |
| GDR | grass drills |
| GUD | guerrilla drills |
| HRR | heart rate reserve |
| IMP | improvement |
| IND AB | at the individual's ability |
| INT | intensity |
| LBS | pounds |
| LC | leader's class |
| MIN | minute(s) |
| MF | muscle failure (due to fatigue) |
| MLE | mile(s) |
| MS/E | muscle strength/endurance |
| NA | not applicable |
| OBS CRS | obstacle course |
| PLT | platoon |
| PRE | partner-resisted exercise(s) |
| PT FLD | physical training field |
| PU-SU IMP | push-up, sit-up improvement |
| R | run |
| SNDBG | sandbag |
| STR CIR EX | strength circuit exercise |
| STR RM | strength room |
| THR | training heart rate |
| TNG | training |
| W | with |
| WT STR CIR | strength circuit with weights |
| % HRR | percent of heart rate reserve |
| 2-MR | 2-mile run |

Figure 10-4 (continued)

### Conduct and Evaluate Training

Conducting and evaluating training is the final phase of the training process. This phase includes the evaluation of performance, assessment of capabilities, and feedback portions of the training management cycle. These portions of the cycle must be simultaneous and continuous. To be effective, the evaluation process must address why weaknesses exist, and it must identify corrective actions to be taken. Evaluations should address the following:

- Assessment of proficiency in mission-essential tasks.
- Status of training goals and objectives.
- Status of training in critical individual and collective tasks.
- Shortfalls in training.
- Recommendations for next training cycle (key in on correcting weaknesses).
- Results of educational programs.

### Using the Principles of Exercise

As CPT Jones developed his program, he made sure he used the seven principles of exercise. He justified his program as follows:

- Balance. This program is balanced because all the fitness components are addressed. The emphasis is on building muscular endurance and strength in the skeletal muscular system because of the many lifting tasks the unit must do. The program also trains cardiorespiratory endurance and flexibility; warm-up and cool-down periods are included in every workout.
- Specificity. The unit's fitness goals are met. The sand-bag lifting and weight training programs help develop muscular endurance and strength. The movements should, when possible, stress muscle groups used in their job-related lifting tasks. Developmental stretching should help reduce work-related back injuries. The different types of training in running will help ensure that soldiers reach a satisfactory level of CR fitness and help each soldier score at least 70 points on the APFT's 2-mile run. Soldiers do push-ups and sit-ups at least two or three times a week to improve the unit's performance in these events. The competitive fitness activities will help foster teamwork and cohesion, both which are essential to each section's functions.
- Overload. Soldiers reach overload in the weight circuit by doing each exercise with an 8-to 12-RM lift for a set time and/or until they reach temporary muscle failure. For the cardiorespiratory workout, THR is calculated initially using 70 percent of the HRR. They do push-ups and sit-ups in multiple, timed sets with short recovery periods to ensure that muscle failure is reached. They also do PRE' to muscle failure.
- Progression. To help soldiers reach adequate overload as they improve, the program is made gradually more difficult. Soldiers progress in their CR workout by increasing the time they spend at THR and up to 30 to 45 minutes per session and by maintaining THR. They progress on the weight training circuit individually. When a soldier can do an exercise for a set time without reaching muscle failure, the weight is increased so that the soldier reaches muscle failure between the $8^{th}$ and $12^{th}$ repetition again. Progression in push-ups and sit-ups involves slowly increasing the duration of the workout intervals.
- Variety. There are many different activities for variety. For strength and muscular endurance training the soldiers use weight circuits, sandbag circuits, and PREs. Ability group runs, intervals, Par courses, Fartlek running, and guerrilla drills are all used for CR training. Varied stretching techniques, including static, partner-assisted, and contract-relax, are used for developmental stretching.
- Regularity. Each component of fitness is worked regularly. Soldiers will spend at least two to three days a week working each of the major fitness components. They will also do push-ups and sit-ups regularly to help reach their peak performance on the APFT.
- Recovery. The muscular and cardio-respiratory systems are stressed in the alternate workouts. This allows one system to recover on the day the other is working hard.

### Conclusion

CPT Jones's step-by-step process of developing a sound PT program for his unit is an example of what each commander should do in developing his own unit program.

Good physical training takes no more time to plan and execute that does poor training. When commanders use a systematic approach to develop

training, the planning process bears sound results and the training will succeed.